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ABSTRACT

Statistical data relating to The Netherlands is presented in 50 maps that were originally published in the "Journal of Economic and Social Geography" between 1977 and 1986. Lengthy annotations accompanying each map provide important background information on the issues depicted. These elucidations were written with the foreign reader in mind, who is not expected to know much about the situation in The Netherlands. Map topics include: agriculture, cars, demography, education, employment, income, migration, on the dole, recreation facilities, social deprivation, voting, and water pollution. This wide range of themes reflects the radical changes in The Netherlands since the mid-1960s, for example, changing norms and values, a dramatic decrease in birth rate, a sweeping rise in divorce, the drop in marriage ratio which caused a more rapid rise in housing demand than in population growth, and the unprecedented pace of economic growth. (JB)

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The Netherlands in Fifty Maps

Journal of Economic and Social Geography

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Special Issue

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THE NETHERLANDS IN FIFTY MAPS

An Annotated Atlas

R. TAMSMA

Emeritus Professor of Economic and Social Geography, University of Groningen

Amsterdam 1988
Royal Dutch Geographical Society

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All maps in this publication were designed by the author. The cartography was done by E. A. Runau and J. Zwart, with the technical assistance of T. Z. Smit, all from the Department of Geography, University of Groningen.

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PREFACE

The *Tijdschrift voor Economische en Sociale Geografie* featured a thematic map of The Netherlands for the first time in the 1961/6 issue, thus beginning a long-lasting series entitled 'The Netherlands in Maps'. This series was started by Professor R. Tamsma, who at that time was one of the editors of the *Tijdschrift*. Subsequent editors persuaded the initiator to continue devising maps until his retirement in 1987. During this period the inside back cover of each issue displayed a cartogram designed by Professor Tamsma. Over the years a total of 150 maps have been published.

On the occasion of the appearance of the 100th map in the series in 1977, all the maps were reprinted in a special issue of the *Tijdschrift* (Tamsma 1977), entitled *The Netherlands in One Hundred Maps*. This publication was widely acclaimed and was out of print in one year.

Since the publication of the 1977 special issue another 50 maps have been produced, and the Royal Dutch Geographical Society has again decided to publish a special issue of the *Tijdschrift*, collating the last 50 maps made by Professor Tamsma. Apart from being a service to those who use these maps as a comprehensive source of information on The Netherlands, the present publication acknowledges Tamsma's achievement in continuing to perform his meticulous task for so many years, making 'The Netherlands in Maps' almost a trademark of the *Tijdschrift*.

In contrast to *The Netherlands in One Hundred Maps*, the present collection of maps has been annotated by the author, and the text was written especially for this edition. As explained in the introduction, the text was not intended to fully explain the spatial patterns featured on the maps. Rather, it was added to provide important background information on the issues depicted, especially for readers unfamiliar with the situation in The Netherlands.

The 50 maps in this special issue of the *Tijdschrift* are arranged in the order of their original publication in the issues 1977/4 to 1986/5. The series reproduced here is a demonstration of the author's ability to utilize an increasing spectrum of cartographic designs. Moreover, it is a documentation of the development of the graphic style of the draughtsmen E. A. Runau and J. Zwart and the technical skills of T. Z. Smit, all at the Geography Department of the University of Groningen.

Glancing through this collection one is immediately impressed by the wide variety of statistical sources available in The Netherlands. Rather than indicating favourable conditions for data collection, this reflects the author's inventiveness in utilising unconventional sources. For various reasons The Netherlands Central Bureau of Statistics has to collect data on a sample basis, which severely limits its use for representation at a lower spatial level.

In a recent editorial (Ormeling & Dieleman 1986) some statistical and cartographic aspects of Tamsma's map designs were discussed, including his endeavour to represent data in an unbiased manner. These efforts have resulted in a rich source of reliable information, which the Royal Dutch Geographical Society (KNAG) is proud to publish.

Johan G. Borchert, Hon. Publications Manager KNAG

References:

ORMELING, F. J. & F. M. DIELEMAN (1986), Editorial: The Netherlands in Maps. *Tijdschrift voor Economische en Sociale Geografie* 77, p. 432.

TAMSMA, R. (1977), *The Netherlands in One Hundred Maps*. Amsterdam: Royal Dutch Geographical Society (*Tijdschrift voor Economische en Sociale Geografie*, Special Issue).

INTRODUCTION

The initial intention of the series 'The Netherlands in Maps' was to present geographically interesting images of The Netherlands to foreign readers. A second aim arose in 1967 when TESG became a publication of the Royal Dutch Geographical Society (KNAG) into which the other two geographical associations were merged, one of which published TESG. This fusion produced more Dutch readers for the Journal, including geographical researchers. We hoped that the latter contingent might be induced to investigate any unexplained spatial distribution showing up on our maps. However, not once in the following 20 years have we found this catalytic function to be effective.

The benevolence of all consecutive editors has enabled us to proceed with the series up to the end of 1986. The termination of this curious mania is due to our retirement, which formally prohibited further use of the services of the draughtsmen. At that very moment and by pure chance, all our 'Netherlands in Maps' compiled since 1961 amounted to exactly 150. It should be mentioned that after No. 100, we published a short article on the selection of map themes and regional frameworks (Tamsma 1977). By the time our work ended, it was decided to reprint the last 50 maps in the form now before the reader. There is one major difference, however, from *The Netherlands in One Hundred Maps* (1977): the addition of an annotation elucidating each map. This was never done in TESG itself because many subscribers have the volumes bound, an operation that normally leaves out the cover. In that case, the annotation would be retained without the map.

The comments included in this edition should be seen as elucidations rather than explanations. The pretence of explanation must be avoided, not only because of our own lack of sufficient knowledge on the themes depicted in quite a few of the maps, but also in view of the brevity we had to observe. The latter restriction could not be applied too rigorously since the texts had to be written with foreign readers in mind. Because they cannot be expected to know much about The Netherlands, the elucidations are more copious than would have been necessary for at least the older Dutch geographers and most of their colleagues of similar age in other social sciences. As several elucidations offer retrospective views of one or more decades, some of our younger compatriots might occasionally come across something new – or again new, for memory is short, even that of university graduates. In addition, the 50 maps relate to moments or periods between 1965 and 1985, two decades that were not only exceptionally dynamic for Dutch society, but also very different from the situation preceding 1965. In the mid-1960s, a breach developed which quite soon became obvious to those who, besides being well informed, had also reached their years of discretion much earlier. Whoever attained that stage after 1965 seldom appreciates how different norms, values and corresponding behaviour (also in spatially relevant respects) had been in the period 1945-1965.

All the maps are based upon regionalised *statistical data*, the publication of which was almost invariably delayed at least several years. This temporal gap was narrowed somewhat during the period in which our 50 maps were published, indicating a quicker digestion of collected data by the Central Bureau of Statistics, which served as the basic source for nearly all the maps. We elaborated on these data in varying degrees for many of the maps.

The *subjects* were selected with the utmost variation allowed by the available supply of data and by our (ageing) fantasy. Yet the chosen themes mirror to a remarkable degree the radical changes in The Netherlands, especially after the mid-1960s as mentioned above. Changing norms and values are reflected e.g. in de-Christianisation (Maps 39 and 49). Closely connected herewith is the dramatic decrease in birth rate (Maps 8, 30 and 46) and the equally sweeping rise in divorce (9 and 38). The phenomenon of cremation (33) is also

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related to this change, as is the drop in marriage ratio, causing a more rapid rise in housing demand (43) than in population growth.

The historically unprecedented pace of economic growth between the mid-1950s and 1970s enabled the development of the world's most exuberant welfare state. Within this framework all kinds of collective goods and services could be financed (Maps 13 and 22). Benefits to the unemployed as well as disabled (19, 24 and 34) were raised ever higher, which in turn stimulated the arrival of foreign labour (4 and 29). As a matter of fact the welfare state required an ever higher number of employees at all levels of public administration (5 and 42). Part of this process was increasingly liberal government subsidies for housing, a policy that simultaneously provided the main instrument for checking further concentration of population in the Randstad by dispersing new dwellings and thus people (7, 35 and 50). As employment did not follow this residential overspill, a growing army of commuters developed (Map 10), increasingly conveyed by cars, the purchase of which was financed by rising incomes (15). The same rise in real purchasing power made further equalisation of net income by progressive taxes politically feasible (17), and even impelled government to ascertain arrears in prosperity by way of other variables in addition to income (23).

The synchronic growth in material wealth and population size, the latter literally a product of the high birth rates in the period 1945-1965, in a country already excessively densely populated, caused a rapid increase in environmental problems. Their solution is being sought in a number of acts. The first one, for the abatement of water pollution, was legislated in 1970 (Maps 14 and 36), while it was not until the mid-1980s that limits were set to an environmental problem peculiar to The Netherlands caused by the very high livestock densities (2 and 40).

Spatial units

Mapping of statistical data in any areal differentiation requires the application of *spatial frameworks*. On behalf of the foreign readers, we present a short sketch of the regional classifications in The Netherlands in as far as they have been applied in these 50 maps.

Government administration distinguishes two corporate levels below the national level: the province and the municipality. From 1840 until 1986 there were eleven *provinces*, to which a twelfth was added as of 1.1.1986, consisting of the three largest polders in the former Zuiderzee. Names and boundaries of the provinces are to be found on the orientation map on p. C3. The formal powers of the provinces were deliberately restricted from the inception of the Kingdom of The Netherlands as a constitutionally unitary state in 1814. This was a reaction to the almost total autonomy the provinces had enjoyed in the Confederate Republic prior to its loss of independence in 1795. For about 150 years the main powers of the province concerned financial control over their municipalities and maintenance of waterways and water control, including full authority over water boards. Since 1965, however, considerably more power has been given to the provinces, especially with regard to physical (spatial) planning and environmental control. As a result provinces are increasingly able to influence forms and functions within their territory, and consequently can now be regarded as political-geographical actors of growing relevance. This is one of the reasons we use the provinces as a framework on no less than eleven of our 50 maps. In some cases, however, this choice was pragmatic, the mapped variables being either only available on a provincial basis or impossible to depict in a visually satisfactory manner for smaller regions on a small map.

Municipalities ('gemeenten' in Dutch) are not differentiated by type (e.g. urban versus rural) in The Netherlands. Constitutionally they all have the same rights and duties regardless of their population size or any other characteristic. Municipalities have diminished in number during the last decades, from more than 1,000 in 1950 to just over 700 in 1986. This process is being continued in order to eliminate units with less than about 10,000 inhabitants, presently considered as the threshold for a satisfactory level of services. This quantitative decrease naturally thwarts comparison over time. Since municipalities are constitutionally subordinate to provinces, their territories are always confined to one province. In general their sheer number makes them unsuitably small units for the dimension chosen for our maps. Yet they have been applied on six maps, either because only a few of them needed to be recorded or because the subject was too typically municipal to use other areal units.

Strictly speaking there is a third type of territorial administrative unit defined in a corporate sense by the constitution, and this type is historically even older than the province and the municipality, *viz.* the *polder boards* or water boards ('waterschap' in Dutch). They have, however, a much more limited package of duties, which is briefly described in the elucidation of Map 14.

All other regions used in this publication have no policy-making function. Two types can be classified as executive, the *Labour Exchange Districts* (see Maps 24 and 37) and the *Water Purification Boards* (14 and 36). The remaining regions have all been delimited for statistical purposes only, but do consist of one or more municipalities; this is ultimately the responsibility of the government's Central Bureau of Statistics (CBS), whether upon request of other organisations or on its own initiative.

The oldest of these statistical spatial classifications is *Agricultural Regions*, dating back to 1910 (and applied in this collection only once, on Map 31), followed in 1920 by the *Economic-Geographical Regions*. Both were formed on the basis of an internally homogeneous economic structure. Thus they belong to the methodological category of 'uniform regions'. Their economic content is dynamic, hence, the need for revision is inevitably proportionate to the speed of economic-structural change, each revision destroying the comparability over time. The number of Economic-Geographical Regions increased from 42 in 1920 to 61 in 1947 (partly by inserting provincial boundaries into the delimitation) and 79 in 1951. The latest division was introduced in 1961, following the 1960 Census, and resulted in 129 regions. The very continuance of the latter division to the present enables comparison over more than 25 years, to be sure, but mocks their economic homogeneity. Nevertheless they have been used in eleven maps because they represent a regional network with the finest mesh that is still clearly observable on a map of this size.

Municipalities were not clustered according to the nodal principle until after the 1960 Census, from which the mobility patterns of commuters were primarily used to delimit 80 *Nodal Regions*, which overstep provincial boundaries where necessary and measure 400 km² on the average. They appear in six maps. Subsequently these 80 regions were aggregated in the early 1970s to form 40 *COROP regions*, an acronym derived from the Dutch name of a Coordination Commission for Regional Research Programs (consisting of civil servants). In spite of its nodal point of departure, this division also had to apply to a number of other measures and variables that were either not available for smaller regions (such as the added value and gross investment by manufacturing and service subgroups) or could not be revealed under the legal guarantee of confidentiality of statistics. In spite of their larger area, these COROP regions do not cross provincial boundaries. With too many (statistical) masters to serve, the COROP regions are geographical Procrustean beds, which nevertheless cannot be ignored for specific information and had to be used five times.

Equally objectionable to the geographer, but fortunately easy to bypass and only mentioned here for the sake of completeness, is the coarsest division of The Netherlands into four or five *macro-regions*, consisting of groups of provinces. Quite remarkably this regionalisation was not created in one stroke but grew gradually, starting in 1956 by combining the three most urbanised provinces, Noord-Holland, Zuid-Holland and Utrecht, into 'the West (of the country)'. This was followed by patching the three northern provinces together into 'the North' in 1958 when their combined total territory was designated as one 'Problem Area' within the framework of regional policy. As an almost inevitable corollary of 'the North', the concept of 'the South' came into being, or better: was revived. For the provinces of Noord-Brabant and Limburg have been conceptually amalgamated since the 16th century; since they remained solidly Roman Catholic, they were not accepted as full-fledged members of the Confederate Republic, but kept in a semi-colonial status until well into the 19th century. The province of Zeeland was in the 1960s wrongly considered part of 'the South'. Zeeland was later separated without being annexed to 'the West' (which would have been fully justified), and thus remained a kind of micro macro-region, 'the Southwest'. At the end of this process the two left-over provinces were thrown together into 'the East', although Gelderland and Overijssel have less in common than the provincial members of any other combination. These macro-regions have no constitutional, legal or any other formal status whatsoever. Yet they are nowadays well-entrenched as concepts among spatial illiterates; more-

over they form standard spatial units in Common Market statistics and are consequently rather well-known abroad.

Six maps do not fit into any of the classifications mentioned so far. Five of them (3, 26, 34, 39 and 47) show a regional breakdown specifically designed for each of the mapped subjects. The remaining Map (21) is a side-step, not highlighting a specific aspect of 'The Netherlands in Maps' but, on the contrary, presenting a global view, also in the figurative sense, as it concerns the only uncontested world record this tiny country has already held for 25 years.

The elucidations have not succeeded in steering completely clear of some names of smaller regions unknown to almost any foreign reader, with the probable exception of 'Randstad', the label for the horseshoe of larger and smaller towns forming the core area of The Netherlands in nearly all respects. Neither The Randstad nor the other (about ten) smaller regions mentioned now and then in the text possess formal or even informal limits. Their names have been inserted on the *orientation map* on the inside back cover.

Readers who are interested in the *cartographic techniques* applied in making the maps are referred to Tamsma, Runau & Smit (1979).

Our elucidations were translated by Mrs. Angela Ashworth who carried out this task with great care. Only this introduction was phrased in English of our own making, and corrected by Mrs. Nancy J. Smyth Van Weesep, who also took care of the copy editing for the whole publication. Last but certainly not least our gratitude must be expressed to Johan G. Borchert for again initiating the idea of republication (as he did for the former volume of one hundred maps) and to the Royal Dutch Geographical Society as well as the Department of Geography of the University of Groningen for financing this collection of our last fifty maps.

R. Tamsma

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Tamsma, R. (1977), One Hundred Times 'The Netherlands in Maps'. *Tijdschrift voor Economische en Sociale Geografie* 68, pp. 129-130.

Tamsma, R., E. A. Runau & T. Z. Smit (1979), Some Cartographic Aspects of Producing 'The Netherlands in Maps'. *Bulletin of The Society of University Cartographers* 13, pp. 1-15.

Map One

LEVEL OF INCOME PER TAXPAYER, 1960 AND 1969

This map depicts the regional differences in material prosperity in 1960 and in 1969, and the changes in them in the two previous decades. This growth is measured by means of the gross income per taxpayer. Gross income is used because the (better) net figures are not available for most years. Income per taxpayer provides a fairer starting point for governmental adjustment policy than income per head of the population. Per capita income is too heavily infuenced by the regional share in the total population of the number of non-earning inhabitants, such as children and old people, especially in the case of small regions. The contrasts on the map are highlighted by the use of only four gradations in the key.

At liberation in 1945, the economic assets of the then 9.2 million Dutch had been for the most part destroyed or transferred to Germany. In the following five years the rich East-Indies colony was lost, resulting in the arrival of 300,000 immigrants in The Netherlands. At the same time there was a 'baby boom' of 1.2 million. The national economy was boosted to a great degree by the 3.5 thousand million guilders in Marshall Aid, which was given by the USA to The Netherlands between 1948 and 1952. The significance of this amount is apparent when it is known that the national income (at factor costs) amounted to barely 12 thousand million guilders in 1948. In order to prevent massive long-term unemployment, the government developed an industrialisation policy for the first time in Dutch history, which was set out in the first 'Paper on the Industrialisation of The Netherlands' (Nota inzake de industrialisatie van Nederland) in 1949. The lion's share of the spatial starting point for industrial growth lay then in the horseshoe of cities which were soon to be labelled 'Randstad Holland'.

The results of this ambitious national effort were spectacularly favourable in the fifties for the country as a whole, but were mainly limited to the West. That is especially evident on the map on the left (which was published earlier with our inaugural address in 1967, entitled 'Intriguing Incomes'). In this publication all these black areas were called 'reversing regions', because their income was not only lower than the national average in 1960, but had also fallen further behind this average since 1950. In 1960 about 40% of all Dutch taxpayers lived in these black regions, and they were dispersed over the whole of The Netherlands to the east of the river IJssel (except for the then new Noord-Oost Polder) and the greater part of the South of The Netherlands. In short this is an almost perfect example of the periphery as served up in theoretical models. This is in reality a strikingly extensive periphery in such a small country and it is, therefore, not surprising that nearly all the 'Development Areas', which were designated as such by the government at the introduction of the regional industrial policy in 1952, were to be found in the black regions.

In 1960 nearly 20% of all taxpayers lived in the regions which also scored lower than the national average in 1960 but had enjoyed a more rapid increase in income since 1950 with regard to the national average and, therefore, were called 'accelerating regions'. They filled the rest of the periphery or linked it up in two cases, namely, in the so-called Green Heart of Holland and in the Veluwe region.

The remaining 40% of Dutch wage-earners lived in the area left over, which precisely coincided with the Randstad, with the exception of three islands situated further away, *viz.* the two IJsselmeer polders (which had been populated 10 to 20 years earlier with carefully selected farmers on farms of an optimal structure) and the municipality of Eindhoven, owing to its housing the headquarters of the largest purely Dutch multinational, Philips. This spatially restricted part of The Netherlands can be further differentiated into two parts, both enjoying an average income in 1960 above the national average. However in the larger part it had also risen more quickly between 1950 and 1960, resulting in our label 'overdrive regions'.

On the other hand there were a few spatially tiny areas, where the income had increased slower than the national average in this decade, and where 10% of the taxpayers lived, the majority of them in the municipality of Amsterdam, where the economic blows of the Second World War had hit harder than elsewhere in the country. These were called 'slow-down regions'.

The right-hand map shows sensational changes in just 9 years (the Central Bureau for Statistics publishes the regional figures intermittently; there are none for 1970). The success of the industrialisation policy of the fifties resulted, among other things, in an emptied labour market in the West Netherlands about 1960, so that employers increasingly turned to the South, East and even North, attracted there by a generous package of regional policy inducements extended since 1958. The scarcity of manpower, moreover, brought about a nominal increase in wages, which steadily exceeded the increase in productivity, and a decrease in the regional wage differential (which was to disappear completely from 1964 on). With the coming into operation of the EEC since 1958, The Netherlands benefited to a great extent because numerous foreign businesses established themselves here, exports and imports increased by leaps and bounds and in the agrarian sector, especially, the small farmers on the southern and eastern sand areas started specialising in animal products for export, an activity which was to quickly get the name 'bio-industry' (see also Map 2). The nationally exploding prosperity, moreover, made the development of a welfare state possible, of which the collective facilities with the accompanying employment opportunities disproportionally benefited the 'peripheral' regions.

All this is demonstrated most spectacularly on the right-hand map in a shrinkage of the black regions, be it mainly in area, but unfortunately not in number of inhabitants. It can be seen that the two largest municipalities of The Netherlands, Amsterdam and Rotterdam, with 12% of the total population between them, have now become shaded black. The maps register inhabitants and consequently do not register the considerable number of high incomes earned in the two cities by commuters. A few small but densely populated areas have remained shaded black, because increases in wages in combination with the opening up of the boundaries within the EEC have led to the closure of previously dominant industries, such as in the textile cities of Enschede and Tilburg, the coalmines in south Limburg, already partly closed down in 1969, and the moribund Groningen peat colonies.

Especially in the East and the South, but also in the North, the black shading has been ousted by the acceleration shading, due to the main causes listed above. The Randstad 'over-drive regions' on the map on the left have spread out over the whole Green Heart of this horseshoe conurbation on the map on the right and have advanced northwards of the North Sea Canal and onto the Veluwe, whilst 'over-drive' islands have arisen in the North and have multiplied in the South (partly through the splitting of statistical regions into smaller ones).

In conclusion it is shown that the richest regions in The Netherlands have nearly all been down-graded to the 'slow-down' category, such as in the dunes strip between The Hague and Leiden, near Haarlem, the Gooi area, Amstelveen and north-east of Arnhem.

Map Two

NUMBER OF CATTLE, PIGS, AND POULTRY PER 100 HA CULTIVATED LAND, 1974

No large economic sector of The Netherlands has profited more from the opening of the international boundaries within the EEC than agriculture, and within this sector principally animal husbandry and horticulture.

Horticulture was formerly mainly concentrated in the west of the country, particularly because of the proximity of urban markets. Before the coming of the EEC in 1958 animal husbandry was much more dispersed. Smaller livestock, such as pigs and chickens, were particularly to be found in areally small farm units, which predominated in the sand areas in the Eastern and Southern Netherlands (this cannot be explained here because of lack of space). Since 1958 these small sand-based farms, in particular, have made a 'bio-industrial' virtue of their need for space by

breeding more and more calves, pigs and poultry in barns, for which their few hectares offered enough space, because of increasing purchases of fodder.

The three maps show an interesting snapshot, because 1974 was a milestone within the EEC. Until then the Common Market was limited to the 'old six' countries, after which the United Kingdom, Ireland and Denmark joined. This enlargement of the market area has led to a further, be it somewhat less explosive, growth of Dutch livestock breeding, as can be seen from Table 2.1.

In the eighties almost a quarter of the world's trade in dairy products is in Dutch hands, and The Netherlands is the largest egg exporter in the world. This was not yet the case in 1974.

On the three maps the smallest regional differentiation in animal density is shown as being that of cattle. Dairy cattle especially are a Dutch specialism which has existed for a long time because of the high groundwater level which renders arable farming less viable than grassland, if not impossible. One post-war development is the production of fattened calves in special units, numbering about 3,000, as compared with 70,000 dairy farmers. The smallholdings again lend themselves best to this type of livestock fattening business and consequently the sand areas show a high density. This density rises to 2.4 times the national average in only one region, the western Veluwe. This is connected with the low iron content of the water through which the veal retains the whiteness which the market values highly. For the rest the density remains below twice the natural average everywhere. Low (40-80) and very low (less than 40) is only shown in areas where arable farming predominates.

Much more extreme are the regional differences on the map for pigs: 15 of the regions even score less than 20% of the national average (the whole of Groningen, Friesland and Zeeland and almost all of Noord-Holland). On the other hand the sand areas in Overijssel and Gelderland often score from 2 to 3 times the average and in east Brabrant en north Limburg densities rise to over 300%. This regional specialisation already existed before the EEC, although at a much lower level of density, and had also led to the establishment of large-scale slaughterhouses (as early as 1870, two slaughterhouses were established in east Brabant, which were to become the nucleus for the Dutch part of Unilever). The growth of pig-breeding after 1958 has been accelerated in this region by the already existing, generally cooperative, agribusiness basis.

The regional pattern for poultry was also influenced by a specialisation existing before the war but this only concerns egg production, which requires a tight-knit auction and distribution system, and in this way encourages locational inertia. The development of poultry meat production is almost totally a post-war phenomenon, and in this sector the slaughterhouses are thus more a locational consequence than a cause of the high rate of development. After 1958, the expansion of the German market, particularly in the Ruhr, in combination with the vulnerable transport of eggs, gave an enormous impetus to the explosive growth of poultry breeding in the immediately adjoining Dutch regions of central and north Limburg. Only these two regions exhibit, therefore, a density five times higher than the national average in 1974, followed closely by the adjacent east Brabant (about four times the national average). Against this the traditional egg-producing region of the Veluwe scored a mere 270%.

This extreme form of bio-industry in The Netherlands is linked to another EEC regulation, namely that grain-substituting fodder products for animals can enter the EEC virtually untaxed. Since these fodders are principally imported through Rotterdam, additional land transport costs to animal feed-processing factories in The Netherlands are lower than elsewhere in the EEC.

Finally it must be noted that the earning capacity of this bio-industry is now to be undermined by a government tax on manure production. The over-production of manure

Table 2.1. *Total number of animals in The Netherlands (millions) and the total agricultural area (thousand hectares) in 1957, 1974 and 1983.*

Year	Cattle	Pigs	Chickens	Agricultural area
1957	3.1	2.5	35.2	2,306
1974	5.0	6.9	62.4	2,088
1983	5.4	10.7	82.2	2,009
Change (%)				
1957 – 74	+ 60	+ 174	+ 74	– 9
1974 – 83	+ 9	+ 54	+ 32	– 4
Change (%) Average/year				
1957 – 74	+ 3.5	+ 10.2	+ 4.4	– 0.5
1974 – 83	+ 1.0	+ 6.0	+ 3.6	– 0.4

from so many animals per hectare has become an urgent problem because of the pollution of both ground and surface water, whilst the nitrogen levels through the atmosphere contribute to acid rain. Industrial installations are to be established, subsidised by this manure tax, where manure can be converted into dry matter. Only in this form is the transport to areas of manure shortage economically viable.

An impression of this manure burden per province, in 1982, is given in Table 2.2 by the kilogrammes of nutritious material which are produced in the form of manure from all livestock per hectare of cultivated land.

Table 2.2. *Nutritious material produced in the form of manure from livestock, in kilogrammes per hectare.*

Province	N Total	P_2O_5	K_2O
Groningen	50	30	60
Friesland	110	50	130
Drenthe	80	50	80
Overijssel	170	100	160
Gelderland	230	150	210
Utrecht	180	100	180
Noord-Holland	60	30	70
Zuid-Holland	90	50	90
Zeeland	20	20	20
Noord-Brabant	260	180	220
Limburg	220	170	180
Netherlands	140	90	130

Map Three

TOTAL INCOME BY REGION AND PER SQUARE KILOMETRE, 1969

The same incomes have been used here as for the map on the right in Map One, but they have been processed in an exceptional regional framework, namely the 44 political districts, which were launched in a bill by the government in 1974. This was an attempt, later abandoned, to form a new fourth tier of government above the level of the municipalities but under that of the provinces. These districts were designated to perform tasks for which most municipalities had become too small, and were formed by amalgamating municipalities in accordance with the nodal principle. In the analysis 70 districts were initially arrived at but that number was reduced to 44 in the 'normative' phase of the policy preparation.

This nodal principal implies that the size and variation of the package of commercial services is determined by the distance radius and threshold value as they are known from the theory of Christaller. To test this the total gross earned income of all inhabitants of each of these districts was calculated (using 1969 data because more recent statistics were not available). This sum was subsequently divided by the land surface resulting in a gross density of purchasing power, which more or less combines threshold value and distance radius.

Although the regional differentiation in gross income per taxpayer is small for larger areas such as these, the differences in population density are great, and it follows, therefore, that there are also considerable differences in density of taxpayers and thus in purchasing power. The latter differences are even so great that a logarithmic scale is necessary to apportion them into a limited number of classes, which can still be used in a black/white cartogram. Not mentioned in the key is the average national income density, precisely *f* 2,000,000 per km² (= 2000 on the map). Within the six classes used, the number of districts and percentages of taxpayers to be found are shown in Table 3.1.

Taking the line of the national average density of 2,000, 35% of the taxpayers and therefore of the approximate population live in districts below this limit. Almost as large a share (34%) is to be found in the districts of class 6 alone, where the income density is at least three times as high as the national average, with a concomitant maximum array of services. The best supplied areas, classes 5 and 6, cover the Randstad within the three western provinces, which is striking but not unexpected. The only other area outside the Randstad in classes 5 and 6 is, quite unexpectedly, south Limburg, where moreover the supply of services is extra great because of the proximity of

Table 3.1. *Income classes by districts and percentages of taxpayers.*

Class	Limits	Number of districts	% of taxpayers
6	5,800 – 15,000	7	34
5	2,400 – 4,400	6	13
4	1,700 – 2,000	7	18
3	1,100 – 1,500	10	19
2	700 – 1,100	8	11
1	400 – 700	6	5
		44	100

the two large urban centres of Aachen and Liege just across the porous border.

The space between this large and small area of highest density is for the greater part occupied by a contiguous area of class 4, stretching from Arnhem southwards and southwesterly to the Belgian border. Thus the so called A-A line from Alkmaar to Arnhem is also notable in terms of purchasing power. This imaginary line divides The Netherlands into two almost equal land areas, but unequal (75%/25%) population shares. Strictly speaking there should be added an M-M line, namely from Maassluis to Maastricht, because to the south-west of this line is situated a small region, chiefly composed of the province of Zeeland, that is similar in density of population and purchasing power to the north-eastern half of the country.

Map Four

EMPLOYMENT OF NON-DUTCH MALES IN MANUFACTURING, 1971

A preliminary technical note is required with regard to this map. The 1971 census in The Netherlands was 'damaged' by two factors: that of insufficient functioning of the technical renewals in the registration process, and the relatively large non-response. The latter was called for by the mass media in the years prior to the census on the grounds of the threat to privacy. The consequence for the census was threefold. First, a part of the results was not published. Secondly, the remaining results were only made available after years of delay, because of which the accompanying map could only be made at the end of 1977. Thirdly, the government decided not to conduct the next census, due in 1980 or 1981, at all. This was particularly unfortunate because the member states of the EEC had made arrangements concerning the contents of their (simultaneous) censuses. It was also the first time that a sovereign state had made such a decision for such a reason.

This map has also suffered because of the shortcomings of this 1971 census. For example, the non-Dutch population employed in manufacturing was registered with insufficient accuracy. Unfortunately this inaccuracy was by no means evenly spread over the whole country. For example, of the nearly 6,000 foreign male workers in the municipality of Utrecht, the class of employment in 4,900 cases was not registered, with the result that only 470 of these males are depicted in this map, that is less than 10% of the unknown 4,900. Somewhat less drastic but, of course, statistically invalid is the situation in Amsterdam, where of the 12,000 working foreign males, 3,600 are known to be employed in manufacturing (and thus visible on our map), but for 3,300 the nature of employment remains unclear.

In order to reduce these imperfections as much as possible, economic-geographical regions rather than municipalities are used as a framework in this map. Yet municipalities with more than 100,000 inhabitants do form a separate economic-geographical region. All in all the map gives a minimum picture which strains reality somewhat. Indeed for the entire country this reality has modest proportions: of the total male employed population, the non-Dutch males formed only 3%, which is far lower than in all other West European countries. The provincial deviation around this average was small. Only in Utrecht and Limburg did this percentage lie between 4 and 5, whereas in 5 provinces it was between 3 and 4, and in the remaining 4 between 0.6 and 2.6. Of all these foreign males, totalling 113,000, about two-thirds worked in manufacturing. This trend began in the fifties on a small scale. At first the Italians were the largest group and were concentrated in the small coalfields in south Limburg. Immigration on a larger scale started from 1960 onwards (the moment also mentioned in the comment upon Map One as the point in time when labour in the West had become scarce). Agreements were concluded with the governments of Italy, Spain, Greece, Portugal and Turkey successively in the years 1960-1964. During the sixties, however, more and more foreigners came to The Netherlands on their own initiative to perform jobs that Dutch workers could increasingly afford to shun thanks to the boom and later thanks to the extremely generous unemployment and other benefits. On the map, there is, for example, a considerable concentration of foreign

workers in Twente (in eastern Overijssel), where by 1971 the textile industry had already been crumbling away for so many years that Dutch workers did not wish to work in it anymore.

Half of all the foreign workers present in The Netherlands came from the Mediterranean countries. The Belgians and Germans formed 7% and 13% of the total respectively, but in the South 15% and 23%. The long boundary between Germany and the Eastern Netherlands might make the presence of a high proportion of Germans likely, but that is not the case. They amount to only 13% there, just as high as their national average.

In the second half of the seventies unemployment in The Netherlands rose quickly, also amongst the foreigners. They were not compelled, however, to leave The Netherlands on becoming unemployed. It was not until September 1979 that the Federation of Dutch Trade Unions advocated for the first time a 'restricted entry policy' in respect of foreign workers. To date this has not been introduced. On the contrary, the right has been given in principle to all foreigners to bring their wives and children to The Netherlands. (For nationals of the member states of the EEC free movement across the 'inner boundaries' is guaranteed by the Treaty of Rome.)

Map Five

MALE AND FEMALE EMPLOYMENT IN PUBLIC ADMINISTRATION, ETC., 1971

This is a complex map, as the relative strength of the employed population in government service, split into male and female, is represented in no less than 129 regions. These two groups have moreover been differentiated in three classes. The limits of these three classes could not be expressed on the basis of arithmetic averages. Quartiles and medians had to be used because both variables are very unevenly spread over the 129 regions.

This dispersion results from the constitutional system of The Netherlands, which is officially defined as a 'decentralised unitary state' (which in fact is becoming increasingly centralised). This leads to a large number of personnel in central government services, a modest number in each of the provincial capitals, and a varying amount at the lowest local level, distributed over 873 local authorities in 1971. Consequently, when municipalities are combined into the 129 regions of the map, then most regions will show low percentages for the number of government officials, although this amount depends on the population size of the municipalities: their staff rises disproportionately with the number of inhabitants: the smallest units (with 1,000-2,000 people) employ about 10, whereas in cities above 100,000 inhabitants, there are generally several thousand (Amsterdam and Rotterdam have more than 25,000 each).

Regions containing a provincial capital show a noticeably larger percentage of government employees. That results not only from the provincial government's own staff, but also from a considerable number of central government staff working in the so-called 'deconcentrated central government services'. These are formally constituted subdivisions of the various ministries attached to the provincial governments. In conclusion the figure is extremely high in The Hague, seat of the central government. Here particularly, and to a lesser extent elswhere, there is a perceptible outflow of civil servants over the surrounding countryside, since they show up on the map by region of residence.

The extreme dispersion of the percentages depicted is already noticeable from the key. In it the median value for females is 2.4%, while the national average is 3.2%, which itself is just above the threshold value of the fourth quartile (3.1%). The scores for the males are 5.1, 6.7, and 6.8 respectively. The maximum values are not recorded in the key: for females this is 9.9% (understandably found in The Hague) and 9.7% in the region around The Hague. For males high values are found in The Hague (14%) and its surroundings (15%), but these figures are surpassed by one extremely high value of 45.1%, attained in the thinly populated northernmost point of Noord Holland, thanks to the presence of the naval base at Den Helder.

In terms of map content the black areas are naturally most striking. Here both male and female employment belong to the fourth quartile. With the exception of The Hague (which

is also a provincial capital) these regions consist of the provincial capitals, unless they are part of a much larger region, as is the case in Drenthe and Overijssel (only in the municipality of Haarlem, which forms a region in itself and is the provincial capital of Noord Holland, does the figure of 6.8% for males not reach the fourth quartile). Other black regions include the extensive but thinly populated central Drenthe (thanks to the presence of the capital at Assen and also a large number of military personnel that live close to the training grounds located here because of the sparse population). Apeldoorn is black because of its garrison and a number of decentralised central government services. The same is true for Den Helder (naval base), Breda (military academy) and Roermond (for reasons unknown).

Regions with mainly or even exclusively high percentages of female personnel are to be found only around The Hague and some other large administrative centres, where the adjoining regions are either small in area or population size, such as Groningen, Zwolle, Arnhem and mid-Zeeland. In many parts of The Netherlands the scores for females do not even reach the median value of 2.4%. In the case of Friesland, Drenthe and Twente, that can partly be ascribed to the large area of these regions, but that is no 'excuse' in the case of the whole of Brabant and adjoining Limburg, where (as in Drenthe) the median value of 5.1% for males is often exceeded much more frequently. The fourth quartile is mostly reached by the males' scores in thinly populated regions with considerable military training areas or air bases, such as the Hondsrug, the whole of the Veluwe, Amersfoort and the bases of Valkenburg and Volkel.

Map Six

UNOCCUPIED DWELLINGS BY MUNICIPALITY, 1977

Although the Dutch consider themselves competent to incessantly tell other states to improve their political structures and even how to do that, these omniscient people have not yet succeeded in fulfilling such an essential need as their own housing shortage during the forty years since the Second World War, despite a constantly changing building policy by central government requiring impressive annual budget contributions. In 1980 for example, precisely 100,000 new houses were built in The Netherlands. Of this total barely 18,000 were completely unsubsidised, whilst 44,000 received a hundred percent subsidy from the government. Between these two extremes, the remaining 38,000 were erected partly at the taxpayer's expense. In the same year the government also provided *f* 3.2 thousand million subsidy on the rents of existing houses, a sum equalling about 3% of all central government expenditure and one and a half times as much as the total Dutch (bilateral and multinational) aid to developing countries, which is itself internationally acknowledged as generous.

As a result of these subsidies, housing expenditure as a share of the cost of living is lower in The Netherlands than in all other Western European countries, with the exception of Ireland and Austria, according to the OECD report of 1983. That is strange since within Western Europe only in The Netherlands is the stock of housing units smaller (4% in 1982) than the number of households. Elsewhere this stock is at least 3% higher, rising to 14% in Austria and 18% in Italy. Scarcity of dwellings therefore is only coupled with a low cost of housing in The Netherlands, one of the many indications of the peculiarities of this little country.

In such a strange situation it is interesting to ascertain whether any areal differentiation exists in this scarcity. Statistical information on this can best be depicted by municipality because residence licences are still required in most municipalities and also because local authorities have the greatest administrative grip on quantity and quality of their housing stock. On the map the foreign observer, first of all, receives an impression of the minimal number of new houses that were not yet occupied on 1-10-1977. In most of the 842 municipalities there was not a single empty new house. Even in the most densely populated province of Zuid-Holland, with 1,100 inhabitants to the square kilometre in 1977, not a single new house was still uninhabited in 107 of the 136 municipalities. On the other hand in the whole country only 15 of these local units are indicated on the map with the largest circle

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symbol, implying that at least 110 new houses were still unoccupied. The negligibly small size of this reserve supply can best be illustrated by the case of Amsterdam, which had a housing stock of about 300,000 in 1977, and where the extremely high total of 506 unoccupied new houses were to be found, mainly in the new suburb of Bijlmermeer where many people did not want to live. Rotterdam, the second largest municipality in the country, had 16 newly completed houses still unoccupied on 1st October 1977, out of a housing stock of 250,000.

The second statistic on the map concerns all unoccupied dwellings expressed as a percentage of the total stock. The national average was 2%, which is considerably below the value of a normal functioning housing market. In only 37 of the 842 municipalities was the excess 4% or higher, the darkest shading on the map, which is spatially concentrated in the extreme nort-east and south-west. These are nearly all rural municipalities with an exceptionally strong predominance of agriculture. Therefore they were at the same time regions with a structural migration loss, particularly of young people. The increased aging of the local population by that means strengthens the slack in the local housing market because the Dutch welfare state establishes attractive old people's homes even in the smallest municipality. The supposition that the excess percentage would be especially high in municipalities designated as 'development nuclei' by the regional stimulation policy of the 1970s tallies only in exceptional cases, such as Delfzijl (6.2%), Veendam (4.3%) and Winschoten (4.8%). However it does not apply in any such nucleus in Friesland or Drenthe, whilst Zeeland, where this stimulation policy was discontinued in 1971, nevertheless shows quite a number of municipalities scoring highly.

Also in the intermediate class of 3.0-3.9% one finds only a few municipalities that were 'development nuclei' in 1977, although these municipalities, totalling 56, are also situated predominantly in the same outer areas of the country. Yet the map also shows a number of municipalities in this intermediate category which are located in the most densely populated part of The Netherlands, namely the south wing of the Randstad, including Rotterdam and The Hague. Rotterdam is to some extent an exceptional case because the municipal housebuilding policy was considerably strengthened after 1972, with the consequence that by 1977 a large number of houses were completed, which were occupied by residents of old houses. Therefore there were almost 7,000 old houses empty on the registration date, leading to a negative occupancy rate of 3.0%, or just in the middle category. In The Hague too nearly 7,000 old houses stood empty on the same date. This was influenced by a relatively large number of house removals, particularly to the growth centre of Zoetermeer. However unlike Rotterdam, the dwelling function of the larger old houses in The Hague was superseded permanently by office functions, not only on behalf of central government itself, but also of semi and non-governmental institutions seeking locations in the immediate vicinity of the political decision-makers.

All the remaining municipalities on this map, numbering $842 - (37 + 56) = 749$, are coloured in the same light-grey tint. This spatially massive uniformity, however regrettable a phenomenon, made the visibility of such tiny units as the municipalities possible on this map.

Map Seven

POPULATION CHANGE, 1967-77

In September 1966 the *Second Paper on Physical Planning in The Netherlands* was published, signed by nearly all ministers. The date of publication implies that the Paper was mainly written in 1965, and that explains the largest miscalculation which it contained, namely that the Dutch population would continue expanding rapidly from 12.4 million at the beginning of 1966 to 20 or 21 million by the year 2000. The contraceptive pill had become available in The Netherlands, however, at the end of 1964. Moreover a social revolution began to manifest itself in 1965-1966, also in the procreative sense (as will be elaborated upon in conjunction with Map 9). As a consequence of this The Netherlands' population was 14.5 million at the beginning of 1986. The prognosis for 2000 is just over 15 million, with

a decrease in population thereafter. This is despite a net immigration balance of many hundreds of thousands, unforeseen in 1966.

The Second Paper predicted that without intervening policies by the year 2000 about 15 million Dutchmen would live south-west of the so-called A-A line (from Alkmaar to Arnhem) which divides the country into two equal halves. The remaining 5 million would live to the north-east of this line. For the three Northern provinces alone, the Second Paper aimed at a forced migration in order to bring their population up to about 3 million by the year 2000, which would be 750,000 more than if current trends were to continue (from 1.3 to 2.25 million). These 750,000 extra people should be transferred from the already overcrowded West. In broad terms it was desired to alter the numbers on both sides of the A-A line by 2000, from the anticipated 15/5 to 14/6.

Besides this macro-scale redistribution of population the Second Paper proposed three aims of government policy for the meso-scale western part of the country:

1) the cities of the Randstad horseshoe were not to grow into each other;
2) the unavoidable population growth of the Randstad must be settled in outward directions;
3) the 'Green Heart' within the Randstad horseshoe was not in any circumstances to be burdened further by more population and more (sub)urbanisation.

Exactly ten years after the government published this Second Paper, it produced an 'Urbanisation Paper', as the most important part of a 'Third Paper on Physical Planning' (which was produced in a number of volumes). This paper of 1976 concluded with regret that little had been achieved of the policy objectives of 1966. Map 7 has been drawn to demonstrate this by depicting the proportional changes in the population size for 129 regions over precisely those ten years between the pretentious Second Paper and the Urbanisation Paper, the latter more realistically formulated after disillusionment with the former. It is evident from the key that the whole population increased by 10.2% over those ten years. For the three Northern provinces together this figure is 11.6%, hardly more than the national average, in spite of the latter's lagging behind the 1966 prognosis.

In the whole area east of the IJssel, and that is nearly everything north-east of the A-A line, only most of Drenthe and east Friesland show an increase of 15-25%. The macro-scale aim of 1966 for the entire North was therefore not attained, particularly due to the much smaller growth of the Dutch population as a whole. For 'new' people can more easily be dispersed by government policies than long-settled citizens.

In the Western provinces the outward growth aimed at in 1966 was indeed realised north of Amsterdam. The extensive black region of the new Flevoland polders should not be taken seriously: on 1.1.1967 only 9000 people lived there, and that had increased to 40,000 10 years later. This is a large increase in percentage but in absolute terms only 3% of the national average increase. Also to the south of Rotterdam the preferred outward growth has been visibly successful, although only in a small area because of the barring effect of the broad estuaries further to the south.

The struggle to keep the Green Heart open has failed completely as the map disconcertingly shows. Nearly all parts of this region show growth rates of 25-30%, large areas considerably higher. That such a phenomenon could occur, despite a much lower population growth than was expected in 1966, can be attributed to different causes. In the first place an effective set of instruments to achieve the stated goal was missing in the Second Paper itself as well as subsequently. In the second place the big-city living environment was allowed to degenerate, so that hundreds of thousands left their urban homes: in the period 1961 to 1973 Amsterdam, Rotterdam and The Hague lost 147,000, 141,000 and 133,000 inhabitants respectively. In the third place the policy-makers overestimated the possibilities for an outward growth beyond the horseshoe. Expansion to the west was blocked by the sea anyway. In addition, to the north and south the horseshoe is effectively fenced in by inland waterways of considerable size, such as the North Sea Canal and the numerous river mouths south of Rotterdam. A resident who does not wish to cross these barriers daily has to turn eastwards (which accounts for the vigorous growth of the Veluwe) or chose to live in the Green Heart, where new residents were heartily welcomed by the local authorities there.

Map Eight

CHANGE IN ELEMENTARY SCHOOL POPULATION, 1975-80

After the procreative storm that followed the liberation had spent itself by 1950, the annual number of live births per 1,000 inhabitants in The Netherlands remained fairly constant for 15 years at a level of just above 20, high in West European terms to be sure. From 1965 onwards this figure began to drop (for reasons which are explained along with Map 7), in the first 5 years to just around 18; in the years 1970-75 steeply, to 13 in 1975; thereafter the drop flattened although the level sunk in 1983 to under 12.

The number of live births per 1,000 women, aged 15-44 years, fell even faster; from just above 100 up to and including 1963 to barely 50 in 1983. The net reproduction rate, determining this decrease, fell to under 1.0 in 1972 and has since then sunk to 0.70 in 1983.

Such a long-term decline makes a prognosis for a period of only 5 years relatively simple, certainly for age-groups as depicted on the map. The 6-11-year-olds form the population of the compulsory primary school. A rapid fall in the birth rate would therefore have great consequences after only six years for the entry flow, and six years later for the exit flows from these schools. Since there exists a legal minimum of pupils per class in The Netherlands, this whole process leads first to the pedagogically undesirable fusing of different classes and ultimately to the closing down of schools.

A solution must be found for this problem at the micro-level of the municipalities (in view of the small activity radius of children in this age group in a country without a school bus system). Therefore the municipalities have been chosen as the spatial unit on this map, although they are actually too small for this map format. This drawback would not be apparent if adjoining municipalities frequently possessed values which would put them in the same class in the key, so that they would have the same cartographic expression. Such a visually attractive working method is only realisable if either the mapped variable presents a small spatial deviation, or the classes of the key each include a very wide deviation. The latter is, however, cartographically not permissible and the former is unhappily not the case. As a compromise nearly 90% of the 842 municipalities have been brought together in 5 classes, which each span a difference of 7%, and together range from 14% above to 21% below the national average. There remain however 42 municipalities with a drop between −21 and −45%, as well as 55 municipalities with exceptionally high positive values, from +15 up to and including +38%.

This enormous variation, which the prognosis expects to occur over a period of only five years, can be explained by a combination of the following factors:

1) religious affiliation;
2) the share of farmers in the population;
3) the age structure determined by the first two factors.

Not included in the prognosis are:

1) the consequences of migration, for which statistics are not available;
2) the effects of education level on the birth rate (to be omitted as the entire Dutch population has a level above the threshold below which this factor becomes significant);
3) the degree of urbanisation (because nearly all Dutchmen can be regarded as having an urban mentality).

The most important explanation for the drop shown here is religion. The lion's share of the municipalities with the greatest proportional drop in the age group from 6 to 11 years is to be found in the provinces of Limburg and Brabant, that is in the overwhelmingly Catholic regions of The Netherlands. This population group, comprising nearly 40% of the population, has had a higher birth rate than other religious groups since the beginning of the twentieth century. A decline began after the Second World War, but with a regional variation in timing and pace. This decline was led by Limburg, probably influenced by adjoining areas of West Germany and the Walloon areas of Belgium, being respectively 80 and 100% Catholic but, nevertheless, having much lower birth rates. Brabant followed in Limburg's wake, and with an additional time lag the smaller Catholic regions to the north of the large rivers, where Catholics form a religious minority. During the period depicted here, Limburg as a whole showed a decline of 15%, that is two and a half times as fast as the national average, and about twice as fast as Brabant and Noord-Holland both averaging 8%. The predominantly Catholic regions

north of the rivers show much less dramatic declines but these areas possess a much higher proportion of farmers than is found nationally, and farmers, *ceteris paribus*, have a birth-rate figure 15 to 20% higher than the national average.

The municipalities in the category of 14-20% decline are also situated for the most part in Limburg and Brabant. A smaller number are to be found in the north wing of the Randstad, but The Hague also falls into this category.

Municipalities in the top category of the key belong mostly to two groups. The first consists of areas where relatively large numbers of young families have recently become established (whether or not they arrived as migrants from the large cities). The second group consists of mostly small rural municipalities with a high proportion of Calvinists ('Gereformeerden'). This religious group had a somewhat lower birth rate than the Catholics even after the Second World War, but their decline was so slow that the more precipitate Catholic line had already sunk below the Calvinist one in 1962, thus promoting the latter to procreational leaders. The impact on the national figures is limited however because they form only 10% of the Dutch population. In the west of the country these small Calvinist communities are to be found mainly in the Green Heart, including especially the strip between the ends of the Randstad horseshoe. They are also relatively numerous in Zeeland, Friesland, and Groningen, with the consequence that these three provinces as a whole exhibit the lowest decline on the map, a mere 1% each. The religiously latitudinarian Drenthe follows close behind with −4%, a score which Overijssel also achieves but in this case it can be attributed to a religious division of the province into a predominantly orthodox Protestant western area and a Catholic eastern area. Such a spatial dichotomy is also to be found in Noord-Holland, where the thinly populated north is still fairly agricultural and 40-60% Catholic, whereas the south is urbanised and quantitatively dominated by Amsterdam with a large majority of non-religious people, who as a group have always manifested lower levels of births than any religious denominations.

In conclusion it is desirable to point out to the foreign reader the complication which the disappearance of primary schools implies in nearly all of The Netherlands. Since the constitutional changes of 1917 all religious schools are financially maintained on an equal footing with the public (i.e. non-denominational) schools. Therefore even in the smallest municipality at least three types of primary school are to be found: a public, a Protestant and a Catholic school. The disappearance of the type of school least popular with parents is a phase reached about 1980 in the smallest municipalities. In larger places there is still at least one primary school of the desired type available, be it at an increasing distance for the child. The great thinning out must therefore be yet to come. For an increasing number of parents the problem has disappeared because of the steeply increasing de-christianisation.

Map Nine

DIVORCE PER THOUSAND MARRIAGES, 1935-74

Before 1940 the differences between the provinces in the frequency of divorce, as shown on this map, could be summarised as a contrast between the West and rest of The Netherlands. Only Noord- and Zuid-Holland scored far above the (internationally low) national average, while Utrecht remained just below this level. In none of the remaining eight provinces was even half of that average achieved, as can be seen in the relevant columns (broken lines).

After twenty years of disruption caused by war, housing shortage, advancing urbanisation and later the beginning of de-Christianisation, the national average had risen 20% (i.e. only 1% per year). However the differences between the provinces have been reduced: in Noord- and Zuid-Holland the increase is lower than this 20%, but together with Utrecht they are still the only ones above the national average, now 69 per 1,000. In the remaining eight, the increase is of course more than 20%. Yet the rise is moderate (25-35%) in the still strongly agrarian provinces of Friesland and Drenthe as well as in Brabant and Limburg, which are both still in the firm grip of the Catholic clergy. The remaining four, however, show 60-80% higher divorce rates

than during the five years before 1940.

From 1955-1959 to 1960-1964 it still seemed quiet on the divorce front. The national average itself has even remained unchanged. However around it there is once again considerable difference. In the most populous province of Zuid-Holland the divorce rate has even fallen by 3%. In Noord-Holland, Overijssel and Gelderland the situation is practically unaltered. Groningen, Friesland and Utrecht show a small rise of 5-9%. However the score of the two completely Catholic provinces is now higher, indicating a loosening rein of the church. In the two most agrarian and thinly populated provinces of Drenthe and Zeeland, substantial rises of 18 and 14% respectively are measured. As a matter of fact Drenthe is only catching up somewhat from by far the lowest figure of the eleven in 1955-59, namely 20 per 1,000, to 23, still the lowest of all the eleven provinces. Zeeland manifests a leap from 31 to 35, still scarcely half the value of the national average. In this province the change is almost certainly influenced by the disruption which was caused by the flood disaster here in 1953. In Drenthe in this period there is a less dramatic but sustained structural change caused by large-scale re-allotment in the farming world, in which many farms disappear, and by industrialisation as a consequence of regional policy.

The changes of 1960-64 to 1965-69 are evidently influenced by the 'revaluation of all values', previously mentioned and literally 'broadcast' by the swift penetration of television from 1965 onwards (in 1958 there was one television set for every 28 inhabitants, compared with one for every five inhabitants in 1968). The foreign and perhaps even young Dutch readers must here bear in mind that – until well into the 1960s – the Dutch population was denominationally segregated into three large groups. Catholics were educated in the Catholic educational system, read only Catholic newspapers, listened almost exclusively to Catholic broadcasting, sought their recreation exclusively in Catholic sports clubs and so on. The Protestant Christians and the Socialists were characterised by the same almost complete isolation from those who thought differently. These three 'pillars' consisted of around 40, 20 and 30% respectively of the national population in 1960. The sudden emergence of television was so exciting, certainly in the first ten years, that everyone watched it, so that the programme-makers reached almost the entire population. A large part of television time was used for talk shows in which successively all existing norms and values were brought forward for 'discussion', a euphemism for their deliberate undermining. It did not take long for all kinds of taboos to be laid upon this audio-visual operating table. In an early stage of this reform campaign the subject of divorce was given its first cut. Divorce was forbidden by the Catholic Church and barely admissible for orthodox Protestants. There were however always some priests and vicars found willing to present a dissenting exegesis. Waverers were often told how much higher divorce rates were in other developed countries and how liberating divorces worked as solutions for even routine marriages.

It is not surprising that from 1960-1964 to 1965-1969 the divorce rate increased nationally by 21%, a rise in which only Noord- and Zuid-Holland remained behind, due to their earlier high figures. This percentage in seven other provinces was between 30 and 50%. Surpassing even that tempo were the two Catholic bulwarks of Limburg and Brabant, although the map shows their frequencies (51 and 57% respectively, in 1965-1969) remaining as yet well below the national average of 84.

Television publicity achieved a much richer harvest in individual liberation through divorce in the last phase depicted on the map. Between 1965-1969 and 1970-1974 the frequency in The Netherlands rose on average by 77%, almost four times as quickly in five years as the rise over the 20 years between 1935-1939 and 1955-1959. A large part of this acceleration was caused by the liberalisation of the divorce laws in 1971. This can be better appreciated if the average frequency over five years for the whole country (149) is presented for each of those years:

1970	*1971*	*1972*	*1973*	*1974*
109	120	152	178	183

With this change in the law the share of marriages of more than 20 years length among all divorces increased disproportionally, in apparent accordance with the motto 'better late than never' and with the ideas of emancipation.

The provincial values once again tended to a further reduction in differences from the national average of 77%. Only the three western provinces showed a lower (but not much low-

er) percentage than 77, and all the other eight provinces a higher one, almost all of them thereby doubling their numbers of divorces. Increases above the 100% level only occurred in the three provinces where the frequency was still the lowest in the period 1965-1969, namely the three most agrarian and Protestant provinces of Friesland, Drenthe and Zeeland. Part of the explanation relates to the change in agriculture, especially the large-scale reallocation schemes at this time which led to a steep decline in the number of farms, abruptly ending for thousands of families the agrarian way of life in which divorce is undesirable if only on economic grounds. Religious conviction was eroded to such an extent during the 1970s that it did not exert much braking force on the divorce frequency anymore. (It is particularly noticeable that the censuses for 1960 and 1971 recorded almost precisely the same percentages per province for the Catholic and Calvinist denominations, both of which are strongly opposed to divorce. This formal immutability of religious conviction is nevertheless accompanied by a doubling of the frequency of divorces, from 69 in 1960-1964 to 149 in 1970-1974. This frequency even trebled in ten years in the Catholic bulwarks of Limburg and Brabant as well as in the still mostly agrarian provinces of Friesland, Drenthe and Zeeland.)

Map Ten

LOCAL EMPLOYMENT AND COMMUTING IN LARGE MUNICIPALITIES, 1975

All 16 municipalities having at least 100,000 inhabitants in 1975 are shown on this map. Of the whole Dutch population of 13.6 million, 28% (3.8 million) lived in these 16 largest cities. This is a low percentage for Western Europe, where 48% of the population in 1980 lived in 'cities with 100,000+ residents' according to 'World Resources 1986'.

However, of the 4.4 million nationally employed population, 36%, or 1,571,000, worked in these 16 largest municipalities. Of the latter amount 1,111,000 were also residents, so that the remaining 460,000 workers were commuters. In other words, the 16 supplied 41% more employment than absorbed by their own 1,110,000 residents.

Which of these 16 largest municipalities manifested a (far) higher percentage than this aggregate level of 141%, thereby showing the more obvious character of a centre for employment? That can be calculated by every reader with the help of the absolute numbers which the map records. However it seems more effective to elucidate this here together with some causes.

The highest score is achieved by Arnhem, with 172%. The working population of 42,000 residents form 29% of all inhabitants. This is consistent for all 16 municipalities whose aggregate average is also 29%, and the variation around this average is very small (ranging from 26 to 33%). The out-going flow of residents from Arnhem working elsewhere was also normal: 6,000 of the 42,000 mentioned, which is 14%, a little under the average of 16% for all the 16 largest together. Arnhem's top score is only caused by the abnormally great in-coming flow of 27,000 commuters. The most spectacular part of Arnhem's employment is the AKZO complex: not only is the head office of this Dutch-German multinational situated here, but also its largest laboratory as well as three factories. Furthermore Arnhem is the provincial capital with all the associated 'decentralised state services'; it is the seat of several large national organisations, including the Giro Service with about 2,000 workers and the Nederlandse Heide Maatschappij; and Arnhem contains a great variety of institutions for higher education.

Somewhat lower than Arnhem but still exceptionally high is the score of 161% of Eindhoven, which needs no further explanation as this is the headquarters of Philips, the largest non-American private employer in the world. (For further information see Map Forty One.)

Well above the average of 141% are 5 other municipalities, including Utrecht, which functionally resembles Arnhem: also a provincial capital containing many educational organisations including The Netherlands' largest university with a payroll of about 5,000. However the role of AKZO is fulfilled here by the headquarters of the Dutch Railways. Groningen also has the same score as Utrecht (150%) but lacks another large employer alongside the

University. Groningen has, however, almost 100,000 less inhabitants than Utrecht so that a considerable influx of workers easily causes a high percentage. Moreover there is no other competing employment centre of any size within a wide radius. In short it is a typical 'primate city' in a contributary region that covers a quarter of the Dutch surface area.

Of the three largest municipalities only Rotterdam with 147% shows an extra 'work employment value' above the average. This is connected to some degree to the spatial form of the municipal territory (even visible on the map): an elongated port area completely crammed with employment, pulling labour from outside across the long municipal boundary. In general the extension of a municipal territory – *ceteris paribus* – tends to deflate the number of in- and out-going commuters. Besides Rotterdam this factor only plays a role at Apeldoorn, which is the second most extensive municipality in The Netherlands with 34,000 hectares. With the exception of the centre of Apeldoorn itself, several smaller places are situated in this area, but the home-to-work journey between them is not statistically registered as commuting.

Another variable which influences the extent of commuting is the density of population, be it only when this becomes so high that there develops a shortage of space for businesses to be located within the boundaries. This is a significant factor in the case of Haarlem, whose municipal land is completely built up, leading to an exceptionally high density of 5,400 people per km^2. Haarlem has a greater out-flow of resident commuters than an in-flow of worker commuters, a ratio that is only repeated in Zaanstad, where the total is, however, much smaller. In both these towns the commuter movement has been heavily influenced by the proximity of Amsterdam since well before 1940. Although Amsterdam is the largest provider of work in The Netherlands, showing about the same in- and out-flow of workers as Rotterdam, it scores much lower in 'extra employment value' because it contains far more locally employed inhabitants (see map).

The Hague is clearly smaller than the two largest municipalities. Nevertheless its daily outflow of commuters is larger than either of the other two (25,000) thanks to a more highly valued living environment. On the other side of the balance its inflow of 57,000 is much smaller than in Amsterdam or Rotterdam. Yet this creates a sizeable traffic problem because The Hague is situated on the coast and therefore only half of the municipal circumference is available to digest the two traffic streams. In reality the congestion is less than should be expected because the two adjoining municipalities of Rijswijk and Voorburg, numbering 100,000 inhabitants between them, form one continuous built-up area with The Hague, so that their commuter exchange generates hardly any car traffic.

Map Eleven

DISTRIBUTION OF POLITICAL AND ECONOMIC DECISION-MAKERS, 1971

This map mirrors the rising interest in the spatial distribution of decision-makers as part of the behavioural approach to geography. Statistical information about this variable has up until now only been available through the Census of 1971. Because these functionaries operate predominantly in and from urban centres, the mapping of their distribution is obviously based on nodal regions. Yet many of these 80 regions are so small that registration based on residential address brings about a smaller spatial concentration than if the map could have presented work locations. It is also regrettable that it was not possible to split up the data by region into the two categories identified in the footnote.

The national total of 107,510 people in 1971 formed 2.2% of the total Dutch employed population. This percentage calculated by region was higher than 2.2% in only 26 of the 80 nodal regions. None of these 26 were to be found in Groningen, Friesland, Drenthe, Overijssel, Zeeland or Limburg, although together these six provinces encompass 34 of the 80 regions. Among the other 46 nodal areas in the remaining five provinces, the 26 with a score higher than 2.2% are to be found. No less than ten of these 26 are situated in Zuid-Holland, although the nodal regions in this province average only half as great in surface

area as the national average of 424 km² (33.943 : 80). This already obvious spatial concentration of decision-makers can be even more sharply focussed by distributing the national total of 107,510 over the regions in percentages, subsequently ranking them according to 'weight', and accumulating their percentages. This produces the top order shown in table 11.1.

Only Eindhoven is outside the Randstad, whilst the first five regions mentioned in the table already account for one-third of the national total. If the regions that belong to the Randstad horseshoe over and above this are added, then almost 50% is reached.

Table 11.1. *Distribution of decision-makers.*

Region	% of national total	Cumulative %
Rotterdam	8.8	8.8
Amsterdam	8.4	17.2
The Hague	7.1	24.3
Utrecht	5.0	29.3
Hilversum	3.6	32.9
Eindhoven	3.4	

The base of the decision-makers pyramid consists of 29 regions which each have less then 0.5% of the 107,510 decision-makers within their boundaries. The absolute minimum per region is 0.1% to be found in six regions according to the map. This clearly concerns only a handful of people in local government, i.e. the omnipresent minimum in the two categories described in the footnote to this map. In the category mentioned first both the provincial and the national administrators are not included in the two largest conurbations, Amsterdam and Rotterdam. Nevertheless, the conclusion that in both cities the decision-makers 'therefore' must belong exclusively to the second category in the footnote is incorrect, as these two largest municipalities each contain a disproportionately large army of local authority officials. Each has more than 25,000 people on the municipal payroll.

Map Twelve

INLAND MIGRATION BETWEEN ADJACENT PROVINCES, 1970-74

Dutch residential mobility after the Second World War reached a peak in the five-year period 1970-74. The affluent society was at its height so that nearly all households had a car; more people were able to live at a greater distance from their work and could afford a better house; and increasingly people could find jobs which compelled them to move house. The oil boycott by the Arab countries against The Netherlands at the end of 1973 was the first hitch in this ever rising mobility, followed in the longer term by the subsequent rise in oil prices, with all the consequences for the price level of other sources of energy and energy-intensive products. These events only exerted their influence in the last year of the period of the map, although net migrations in 1974 had already previously been decided upon.

Both maps aim to analyse how far, even in this period of maximum migration, spatial movements predominantly occur over short distances (as the migration theorists propound). In this context 'short' means to and from adjacent provinces. A restriction to provinces is inevitable here because separate maps are necessary for emigration and immigration, and two maps on this type of area are each so small that only a provincial scale guarantees sufficient legibility. On both maps triangular arrow symbols are grouped along common boundaries between two provinces. The number of symbols indicates how many percentages of the total emigration (left-hand map) and immigration (right-hand map) of each province refer to the province on the other side of this particular boundary stretch. The arrowhead of the symbols points outwards on the left-hand map and inwards on the right-hand map.

The boundary between Friesland and Drenthe provides an easily calculable example. On the left-hand map are twelve out-going symbols on the Frisian side, indicating that 12% of the total Frisian emigration in 1970-74 turned up in Drenthe. On the Drenthe side the ten out-going symbols indicate that 10% of all emigration from Drenthe went to Friesland. On the right-hand map however, just nine incoming symbols from Friesland are to be found on the Drenthe side. The Frisian share of 9% in the total Drenthe immigration corresponds to the 12% of the Frisian emigrants on the left-hand map.

The number of emigration and immigration

symbols is theoretically influenced by the length of the boundary, the number of adjoining provinces and the push and pull of the home province in comparison with those of the other ten, whereby a given pull exerts greater influence as the distance to it is shorter. A small length of interprovincial boundaries and a slight number of adjacent provinces are characteristic for the 'corner provinces': Groningen, Limburg and Zeeland adjoin only two other provinces and each have a long boundary with the sea and/or a foreign country, across which there is naturally no interprovincial migration. Also the fourth 'corner', Noord-Holland, borders on only two provinces, apart from its boundary with Friesland, which is only a point on the Afsluitdijk (the dyke from Enkhuizen to Lelystad was not yet completed in the years 1970-74).

Whoever takes the trouble to count the number of symbols per province on both maps, will indeed discover a general increase in that number as the boundary length and the number of adjacent provinces rise. On both maps the number is lowest in Groningen, Friesland and also in Overijssel, followed by Noord-Holland, Limburg, Zeeland and Drenthe. Conversely the greatest numbers are to be found in Gelderland and Zuid-Holland (the only two bordering on five other provinces). Utrecht, situated between the last two and having only three adjacent provinces, is next; but as can be seen from both maps, Utrecht exchanges more than 70% of all its emigrants and immigrants with Gelderland and Zuid-Holland. The immigrants come mainly from Noord- and Zuid-Holland and number nearly 60% of the Utrecht total, while Gelderland plays the greatest role in the exodus from Utrecht, which accordingly fulfills a relay function. Utrecht also carries off the prize if the in- and out-flows are expressed in terms of percentages of the Utrecht population at the start of the period. Obviously Utrecht is also the migratory central switch of the whole of The Netherlands, just as in the case of road, rail and inland water transport. This is further stimulated because a) eastern Utrecht is perceived as residentially attractive; b) the province contains three official growth nuclei, of which Leusden and Nieuwegein grew more than 50% in 1970-74; and c) Utrecht University attracts thousands of new students annually, forming relatively large flows over a five-year period in a province with only 800,000 inhabitants.

A large university plays an even greater role in the migration picture of Groningen because this province has a population of barely over 500,000, of which a third live in the city of Groningen, which is situated on the boundary with Drenthe. This greatly increases suburbanisation across this border, the more so as northern Drenthe offers a highly valued residential environment. No other interprovincial boundary is accompanied by so

Table 12.1. *Some data on interprovincial emigration and immigration in 1970-74.*

	Thousands						Percent					
	Inhabitants at 1.1. 1970	Incoming from other provinces	Outgoing to other provinces	Migration sum (2 + 3)	Migration balance (2 − 3)	Inhabitants at 1.1. 1975	Incoming (2 in % of 1)	Outgoing (3 in % of 1)	Migration sum (4 in % of 1)	From adjacent provinces in % of 2	To adjacent provinces in % of 3	Number of adjacent provinces
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Groningen	517	75	74	149	+ 1	536	15	14	29	42	47	2
Friesland	522	60	53	113	+ 6	554	11	10	22	38	49	3[a]
Drenthe	367	73	57	130	+16	401	20	16	35	57	61	3
Overijssel	921	106	103	209	+ 3	977	12	11	23	44	49	3
Gelderland	1,506	226	190	416	+36	1,621	15	13	28	73	75	5
Utrecht	801	164	150	314	+14	858	20	19	39	76	71	3
Noord-Holland	2,244	191	240	430	−49	2,285	9	11	19	51	48	2[b]
Zuid-Holland	2,969	215	292	508	−77	3,025	7	10	17	81	80	5
Zeeland	306	42	33	74	+ 9	327	14	11	24	61	59	2
Noord-Brabant	1,788	186	144	330	+42	1,941	10	8	18	73	70	4
Limburg	999	76	77	153	− 1	1,044	8	8	15	54	56	2

[a] Excl. Noord-Holland.
[b] Excl. Friesland.

many symbols, which are also strikingly balanced on both sides, as the one between Groningen and Drenthe.

On each of the two maps the ratio between the number of symbols on both sides of a boundary is nearly everywhere 1:1 or 1:2. The greatest inequality lies on the interface between Zuid-Holland and Zeeland: on the left-hand map 1:5 and on the right-hand map even 1:8. Somewhat less out of balance is the situation between Zeeland and Brabant. It must not be forgotten that the symbols only represent percentages in both the cases mentioned above of adjacent provinces with extreme differences in population size: Zuid-Holland has ten times as many inhabitants as Zeeland, and Brabant over six times as many.

This, in some cases considerable, difference in absolute numbers of migrants concealed behind the percentage symbols requires some additional information summarised in table 12.1.

Map Thirteen

INHABITANTS PER FORM OF SPORT ACCOMMODATION, 1975

This map is cartographically so wrong that it might end up in 'textbooks' as an example of how it should not be done. This spatial presentation of pure figures was nevertheless adopted because it seemed the only way to present six types of sport accommodation in 80 regions on a comparative basis in one map.

In general the frequency with which a sport facility occurs spatially differentiated, is influenced above all by two factors:

1) population density: the higher this is the greater the number of inhabitants that want to make use of the facility and are able to do so, given the range;

2) the availability of financial means, not only to install the accommodation but also to exploit it, implying the availability of government subsidies if the influx from private sources is insufficient. In The Netherlands such subsidies normally come from local government, but central or provincial government can help out if it is considered politically desirable.

The latter has certainly been the case in The Netherlands for several decades as part of the government's regional stimulation policy. This began in 1952, was extended to ever more regions until 1971, after which it was cut back again. From 1954 onwards part of this policy was the 'Special Regional Welfare Policy' (BRW). In this connection extra money from the Treasury was made available to improve 'the quality of life' which included the provision of sport facilities. This extra BRW funding provided nearly all municipalities within such regions with even more and/or better facilities than they already possessed, and furnished many local authorities with sport facilities that they could never have paid for out of their own budgets. The consequence of this BRW is that in regions receiving such extra support, the figures in most or even all squares on the map are lower than the national average and noticeably lower than in the densely populated regions (which are mostly situated in the West of the country, where participants in sport 'must wait longer for their turn' on the whole).

This is immediately observable by a comparison of the *football squares*. Although this is an old, universally popular sport with small regional differences as a consequence, all regions scoring a three (which is equal to 2,500-3,500 inhabitants per football field) are located in the Randstad from Amersfoort-Utrecht round the horseshoe up to and including Rotterdam (the Woerden region being the only one with a score of four). On the other hand regions with a score of one are mainly to be found in the three northern provinces (which have been receiving regional subsidies since the start in 1952), in northern Noord-Holland and east Brabant (both supported by the state for a shorter time).

Hockey is played much less than football in The Netherlands. Nationally there are eight times more inhabitants per hockey field than per football field (see the square in the key). In eight of the 80 regions there is no hockey field at all. However hockey is historically an 'elite sport', which was almost only played in a handful of affluent regions before 1940 and became somewhat more widespread after 1950. No less than 29 of the 80 regions show a figure of 26 or higher, i.e. more than 1.5 times the national average. Of these 29 there are even 17 scoring higher than twice this average (35). On the other hand eight regions have scores of nine or lower, amongst them such classic

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hockey bulwarks as the regions of Haarlem and Hilversum, but not The Hague, Amsterdam and Utrecht, where relatively much more hockey is played, but the large population numbers suppress the figures in the hockey square (although only to twelve in The Hague and 14 in Utrecht).

Tennis was also an elite sport before 1940 but after that it became more universal. In 1975 there was an average of 3,200 inhabitants per tennis court, only 1.5 times as many as the 2,100 per football field. Despite that post-war dispersion, the regional pattern is peculiar: in the North the figure is higher than the national average of three nearly everywhere. In other words, the BRW policy has done little for tennis courts. The situation in the Randstad is favourable: at least three or lower. Even Amsterdam has less inhabitants (3,000) per tennis court than the national average of 3,200. The provision is also generous in eastern Brabant and mid-Limburg, a situation for which there appears to be no explanation.

Gyms and sport halls belong however to the standard BRW packet: in the North (except on the boundary of Drenthe and Overijssel), in northern Noord-Holland, Zeeland, east Brabant and Limburg this provision is more ample than the national average, whereas more than 40 other regions score lower or much lower than this national average.

The *indoor swimming pool* is a very expensive facility. Yet it is absent in only six of the 80 regions. Because only the larger municipalities can afford this type of investment and exploitation, the presence of such a swimming pool elsewhere is proof of government subsidy. Nevertheless on average 60,000 people are apparently required as a threshold per indoor swimming pool. Municipalities with a (much) larger population can provide their region with a good score on the map. Where such a large settlement is lacking, only a subsidy from The Hague ensures a good provision. It must be repeated that the state does not subsidize the exploitation costs, so that a growing number of smaller municipalities were feeling the pinch financially through the possession of such 'nice things for the people' in the period of financial cutback since 1980. This is mainly a threat in Groningen, Friesland, northern Overijssel, northern Noord-Holland, Zeeland, Brabant and Limburg, all regions which received indoor swimming pools through the BRW.

Much cheaper, though only profitable on a strictly seasonal basis, is of course the *open-air swimming pool*. This facility was always relatively abundant in a country so well endowed with water as The Netherlands. All the regions of the four most northerly provinces, with the exception of Enschede, mostly score well under the national average of 25,000 inhabitants, but so also did most of Gelderland, Noord-Holland 'above the North Sea Canal' and the Delta region excepting Middelburg and Goes, where the proximity of the beach perhaps led to allocating the subsidies for other purposes. Good scores are the exception in water-scarce Brabant and Limburg. Or did municipal councils in these areas allocate less money to swimming pools until recently because the Catholic Church disapproved or even prohibited 'mixed bathing', with the longer-term effect that this type of recreation remained unpopular? Herewith a third explanatory variable is touched upon for the spatial differences in the distribution of certain sports besides the two factors mentioned in the beginning. However the Geography of Sport is still too much in its infancy to allow comment on specific sports.

Map Fourteen

FINES LEVIED FOR WATER POLLUTION, 1975-79

In The Netherlands the 'Purification of Surface Water Act' (WVO) was the first in a series of environmental laws which mostly came into force in the seventies. As the name implies, it only concerns surface water. A special law concerning groundwater was passed later. The WVO became operative on 1 December 1970.

The law is based on the principle of administrative decentralisation. That implies first of all that the central government's responsibility is restricted to the state waterways. To this category belong all salt 'outer waters' as well as the IJsselmeer, the great rivers (the Rhine branches and the Maas), the large inland shipping canals, but also a series of smaller waterways, which are under the guardianship of the state due to historical circumstance. These state waterways are indicat-

ed separately on the map.

The wvo assigned the management of the purification of all other surface waters to the provinces, which however received the formal power to delegate this task to still lower authorities. In this instance the legislators were thinking mainly of the water boards, of which there were still hundreds in existence in 1970. These are the oldest public statutory organisations in The Netherlands (the first dating from the late Middle Ages) and they have the task of keeping The Netherlands dry, no easy job in a country where half the land lies below sea level. Accordingly the water boards have carried out water quantity control, especially in the low-lying West and North, for centuries to everyone's satisfaction and could therefore be regarded just as qualified to guard the quality of the water. The legal delegation of the task to the provinces led to a provincially differentiated organisation as can be seen from the map. Three provinces kept the administration of the wvo in their own hands, namely Groningen, Friesland and Utrecht. Some others set up special 'Water Purification Boards': Drenthe and Limburg each established one for their entire territory, while Gelderland preferred three for the whole province. In Overijssel and Noord-Holland a water purification board was set up for part of the province, while in the other parts this task was entrusted to water boards. The remaining three provinces have delegated the entire task to their water boards, be it sometimes after reorganising them when it was considered necessary to fuse the numerous small water boards into larger ones. Only large organisations would be able to build the expensive water purification plants, install an underground network of pipes and exploit this financial, technical and organisational infrastructure.

The latter activities are called active management. There is also a passive form, which consists of a system of prohibitions, regulations and licences with regard to the effluence of polluted water. The levies are imposed by the quality control management, thanks to its legal authority under the wvo. The amount of the levy is based on the guiding principle for the financing of the wvo, that 'the polluter pays' as much as is needed to eliminate the pollution he has caused. Pollution in the form of oxygen-binding materials is expressed in the unit described in the caption to this map (which was later somewhat amended). For other materials weight units drained off per time-unit are applied. Such drainings moreover require an effluence release licence in which conditions designed to reduce effluence are set. This has indeed caused most industrial effluents either to disappear or to be reduced considerably.

The force of the new law would have led to extremely high levies to finance all the initial investments in the first years after 1970. In order to even out such peaks the state provided subsidies for the regional water authorities. The money for these subsidies was obtained from the levies paid by the polluters of the state waterways. To be sure the state restricts itself to passive management only. An active role was not considered necessary because nearly all state waterways are self-purifying owing to the vast quantities of water flowing through them. This contrasts sharply with the numerous small waterways, which are moreover divided by sluices into compartments containing only small and scarcely moving quantities of water. Therefore the levy for draining a given volume of polluted water in a state waterway is also lower (and in the case of salt water much lower) than into a 'regional waterway'. That is seen by comparing the fees on the map with those of the state which are given in the key. It is not known whether any business has ever moved to a location where it is possible to discharge into a state waterway in order to economise on fees in this way. This seems unlikely because the government wants to discontinue the discharge of polluted water in the whole country around 1990.

The spatial organisation described above has led to nearly 40 regional water quality control authorities, which are distinguished on the map by shading and by levy. In the southwest Netherlands the fragmentation is particularly noticeable. This is caused by delegation to the water boards, of which there is at least one on every island in the delta. However the provincial government of Zuid-Holland formed one purification organisation in the southern part of its territory, to which nine water boards had to assign their qualitative task.

The differences in amount of the levy shown on the map are substantial. Nine regions show amounts above *f* 40, while seven are lower than *f* 30. The cause of this is primarily rooted in the population size and density: where these are small and/or low the levies per head are high, not only because of the cost of the actual purification (as such installations pro-

duce considerable economies of scale), but also because of the system of pipelines that quickly becomes more expensive per linear kilometre when the originators of polluted water are more thinly dispersed. A second cause is the moment at which construction of the purification plants were begun: in regions where these came into operation long before the WVO, the costs have been to a great extent, or even completely, written off. In other regions the start had to be made in 1970 in a period of rapidly accelerating building costs. This last factor forms the principal explanation for the second set of data in the map, *viz.* the steep rise in the levy. Where the commencement of water purification was late, the rise is high. Yet this price mechanism is thwarted here and there because the rise is tempered by subsidy from the provincial government ensuing from political pressure, which implies that then 'the polluter temporarily does not pay enough'. Such a policy cannot be maintained for long by the provinces, however, because they do not have enough financial elbow-room.

In conclusion it must not be left unsaid that this whole system has led to a problem in the eighties for which no solution has been found as yet: the disposal of the enormous quantity of purification silt which is continuously being discharged from the hundreds of purification plants now covering The Netherlands. Initially it was possible to sell this silt to farmers and to municipalities as fertiliser for parks. These clients have become reluctant now that it has been discovered that this silt generally contains substantial quantities of heavy metals.

Map Fifteen

NUMBER OF CARS PER SQUARE KILOMETRE, 1975

In 1975 in The Netherlands each square kilometre of land was on average not only occupied by 400 people but also by 100 private cars. All these cars were only in motion for a limited part of the day (each was driven only 15,300 km on average in 1975), and consequently they were parked for the greater part of each 24-hour period. It is not known precisely how many Dutch people had parking space on their own premises, but on the basis of the nature of the existing housing stock that number is estimated at 10% at the most. In other words 90% of all those cars were standing 15 to 20 hours each day parked on the public road. That is not the case with lorries, which would not only be used to the maximum but are parked for the rest of the time on business premises. Therefore this map is restricted to private cars.

Public space has only been allocated for special parking places in residential areas since about 1965, at first small-scale and later somewhat more. Previously builders thought this provision superfluous since in 1960 there were less than 50 private cars per 1000 inhabitants in The Netherlands, and these were mostly owned by the well-to-do who had access to a garage or at least parking space at their disposal. Only five years later, in 1965, there were more than 100 cars per 1000 population. That number was doubled again in five years to 200 per 1000 by 1970. There was a slight slackening in this exponential growth of car ownership after the oil crisis of 1973, so that there were only 250 cars per 1000 inhabitants in 1975, the year that concerns this map. From 1976 onwards the pre-1973 rate of increase was resumed, so that by 1980 there were 320 cars for each 1000 inhabitants.

In the United Kingdom, Italy and Denmark there were also about 250 cars for each 1000 inhabitants in 1975. In Belgium there were 260, and in France and the German Federal Republic there were 280. These last somewhat higher figures might be explained by the predominant use of home-produced cars rendered cheaper due to the absence of import duties. However the differences between the West European countries are minimal. Total car ownership in The Netherlands might be somewhat depressed by three specifically Dutch characteristics, namely,

1. a smaller number of married women with a full-time job (that easily leads to a second household car);
2. the very dense public transport network with passenger fares that are kept low thanks to greater government subsidies than in other countries (in 1975 the cost of passenger transport by train was subsidised by 47%, by regional buses by 52%, by local transport by 67%. These figures had risen to 48, 67 and

78% respectively in 1980); and
3. the considerable shortage of parking spaces in many historic, 'canal-ridden' inner cities, especially in the West.

The country is divided on the map into 129 regions. These show a spatial distribution in the density of cars which accords well with the density of population, because the number of cars per 1000 inhabitants in all 129 regions is between 200 and 300, deviating little from the national average of 250. The car density differs, therefore, just as much between the regions as the population density (see Map 7). These differences are so great that the logarithmic scale is necessary for the definition of the car density classes. Reading from the bottom to the top in the key, each of the six classes contains 33, 38, 21, 18, 10, and 9 regions respectively. Only in the bottom two classes is the car density below the national average of 101. That may well conceal a possible shortage of parking space in some large centres within these regions. Nevertheless these are the regions with the lowest population density and consequently with only a small share of housing in the form of blocks of flats in which a number of homes are piled up on a small surface area but the cars pertaining to them must nevertheless find parking space horizontally.

Every car requires about ten square meters (5 × 2) storage area. As mentioned above for about 90% of cars this space is to be found along the public road. There are many streets in larger cities occupied by an almost unbroken line on both sides of the road for 15 to 20 hours in every 24-hour period. Where the street profile dates from the car-free days, these cars are parked partly on the pavement and/or they constrict the driving area of the street so much that one-way traffic circulation is necessary. The 'Land Use Statistics' which distinguish between 35 different uses, can give a useful indication here. The category 'paved roads' includes roads both inside and outside the built-up area, but the former approaches 100% in those regions with the highest density of population, and thus also of passenger cars. These are the black areas on the map. The table below gives the surface area of these nine regions. In the case of The Hague the figure in column 3 seems to indicate that public car parking occupies even more space than there are paved roads so that in theory absolutely no traffic circulation is possible. In the other eight regions between 40 and 80% of the road area appears available for circulation. This is clearly a flattering picture since many of the paved roads are arterial and forbidden to parked vehicles. Furthermore a considerable share of the paved road area, especially in Amsterdam and Rotterdam, is situated in port areas remote from residential regions. The pressure of car parking on the residential streets is therefore higher than appears from the table. The 'psychological overpopulation' is strongly influenced in The Netherlands by the perceived crowding which is more a crowd of cars than of people.

Table 15.1. *Space needed for the parking of all private cars, in comparison with the area of paved roads, in the 9 economic-geographical regions with 800-2000 private cars per square kilometre, in 1975.*

Region	Ha needed*	Ha of paved roads	1 as % of 2	Total private cars per km² of land
	(1)	(2)	(3)	(4)
The Hague	127	114	111	1,957
Haarlem	43	70	61	1,418
Amsterdam	192	508	38	1,128
Utrecht	60	413	15	1,096
Leiden	23	136	17	1,010
Delft	24	135	18	922
Schiedam/ Vlaardingen	45	226	20	902
Nijmegen	36	115	31	849
Rotterdam	153	1,072	14	815

* 10 m² per car, so that this figure is the same as the number of private cars × 1000.

Map Sixteen

GROSS REGIONAL PRODUCT OF PRIVATE BUSINESS, 1975

This map is based on a CBS publication, the first of its kind, entitled *Regional Economic Annual Statistics 1975*, and is concerned with concepts from the world of national accounts. The spatial framework is provided by the *Corop* regions which are qualified in the Introduction as geographical Procrustean beds.

The term 'gross regional product' in the title

of the map can be substituted by 'added value' for a better understanding by some readers. The publication named above distinguishes between two major groups of producers namely, 'total businesses' and 'government'. The map depicts only the first group by region, and it is defined in the caption by the somewhat unfortunate term 'all non-government businesses', to prevent misunderstanding. This main group was responsible in 1975 for 86% of the total added value for the whole of the country, so that the main group 'government' generated the remaining 14%. This 86% represented a figure of *f* 179 thousand million, being the difference (49.5%) between *f* 362 thousand million production value (100%) and *f* 183 thousand million purchased inputs (50.5%).

The map shows two variables per region:
a) the percentage that each region contributed to the national added value of *f* 179 thousand million, expressed in block symbols. This percentage in the 40 regions ranges from a minimum of 0.3% (Flevopolders) to a maximum of 12.3% (Rijnmond);
b) the percentage that the regional added value formed of the regional production value, represented by choroplethic shading. For the whole of The Netherlands this percentage is 49.5 (as mentioned), but in the 40 regions it ranges from a minimum of 28 (IJmond) to a maximum of 69 (north Groningen).

Variable a

It is naturally not unexpected that the highest contribution to the national added value is contributed by Rijnmond and Amsterdam. The extent, 12.3 and 10.0% respectively, might be surprising, but is due to the size of these two regions. Rijnmond contains the whole port area that is usually called Rotterdam for convenience but is to a considerable degree situated in other municipalities. This whole complex forms the largest port in the world (since 1962), so that this 12.3% is not really surprising. The Amsterdam region is so arranged that within its limits there are the national airport Schiphol (where 23,000 people worked in 1975) and a concentration of many large offices in the Amstelveen municipality. The next largest contributor is, remarkably, 'Greater Groningen', a thinly populated area containing only the middle-sized city of Groningen. The explanation for this exceptionally high contribution is solely the siting of the world's largest gas field in this region (surpassed after 1975 by a single field in the Soviet Union). The truly gigantic amount of 81 thousand million cubic metres of gas was produced here in 1975. The following regions in the sequence are quite normal, although Utrecht's contribution at 5.9% ranks somewhat higher than that of The Hague at 5.2%, thanks to the Utrecht region also encompassing the whole province of that name. The substantial contribution of The Hague is peculiar, given the overpowering role of 'government'. This contribution is three-quarters supplied by the service sector as The Hague has hardly any industry. Only in sixth place follows the region of southeast Brabant, from which a higher contribution than 4.3% would be expected because of the location of Philips. However if an enterprise has plants in different regions, their production values, inputs and added values are added to the region where this production takes place. Philips has only a part of its Dutch production in southeast Brabant (see also Map 41).

Variable b

The sharp differences between the 40 regions in respect of this variable are 'encapsulated' in five classes on the map. The interpretation of the differences is made difficult because the source of the material adds together many classes of production because of the so-called 'statistical secrecy'. The added value is exceptionally low in just two regions, IJmond and the Zaanstreek, both dominated by one kind of manufacturing activity. The Netherlands' only blast furnace and steel complex produces 70% of IJmond's production value, but uses 80% of all regional inputs, so that the contribution to the added value is only 40%. This represents a very characteristic ratio for such an activity if it, as here, is not located on a coalfield and/or an iron-ore mine. In the Zaanstreek the production of foodstuffs has predominated for centuries based on imported raw materials, with an accordingly low added value.

The highest class on the map contains nine regions, with the area of Groningen already mentioned scoring highest, where the predominating natural gas is produced with a minimum of input costs and almost without personnel. The high position of the remaining eight rests mainly on an excess of services in which, as is widely recognised, the added value forms a much higher percentage of the production value than in the primary and es-

pecially in the secondary sector. For the whole of The Netherlands the added value is 71% of the total production value in this service sector, but in all sectors together only 50%. This attractive attribute of the service industry, resting on a large input of labour not calculated as input in the system of national accounting, is nationally less highly valued economically because only a small part of the services are regarded as export-generating. The lion's share of the service sector concerns inland transactions which each time are fiscally creamed off, thus creating the financial basis for all those forms of service activity being either operated by the government or kept going by its subsidies. This fiscal aspect leads to the subject of the next map.

Map Seventeen

GROSS AND NET INCOME PER EMPLOYEE, 1974

Regionally differentiated information on personal incomes is published every two to three years in The Netherlands both per head of the population as well as per tax-payer. The taxes levied on these incomes and the resulting net incomes are published much less frequently. Since 1960 this has only occurred once, in 1974, although the data were not released for publication until 1979 by the tax collector's office.

The purpose of the double maps was to show the difference between gross and net income, not per inhabitant but per tax-payer for reasons already given with Map One. This difference between gross and net income is great in The Netherlands in comparison with most other countries for two reasons. First of all the proportion of direct taxes on income is high, owing to a considerable fiscal discipline amongst the citizens, and that of indirect tax is therefore in proportion low. In the second place the tax scale on personal income is highly 'progressive' in the fiscal sense of the word, although this is a consequence of progressiveness in the political sense.

The average incomes by region are not given in absolute amounts on both maps but as a percentage of the national average. In this way it remains possible to make comparisons with earlier and subsequent years.

The left-hand map shows that even spatial differences in gross income in The Netherlands are small. In the richest class (135-147) there are only four regions. The top region amongst these only scores 147% of the national average, despite the statistically important factor that only 8,000 tax-payers live in that region (the smaller the number of incomes in the selected spatial entity, the greater the discrepancy, whether positive or negative, in respect of the national average). There are also only four regions in the next richest class. Six of these eight 'well-to-do' regions are located in the Randstad. All six are suburban fringe municipalities, just like the only rich region in the Northern Netherlands. The only exception to this 'fringe rule' amongst the wealthiest eight are the Flevopolders, where only a mere 9,800 tax-payers lived in 1975, mainly selected farmers and civil servants who were building up these brand new polders.

The poorest gross class on the left-hand map is more interesting. It contains 33 regions but even in the poorest of them the average income was still 84% of the state average.

The right-hand map shows the progressively equalizing role of the tax collector. The black regions have disappeared, and of the eight richest regions on the left-hand map there are now only five left in the class 125-134. Even the class 115-124 has thinned out from ten to six regions. On the other hand the poorest class has dwindled from 33 (on the left) to just 22 regions (on the right). The middle category round the state average, coloured grey, has also increased from a total of 62 out of all the 129 regions (left) to a total of 75 on the right-hand map.

The net incomes, which is all that people are interested in, were in 1974 so spatially equalized in The Netherlands that a further eroding of the differences was hardly possible anymore. This was a frustrating prospect for the first really left-wing cabinet since 1945 that came into power in 1973 and set itself the objective of 'a further reduction in income differentials'. This impossibility was based on the simple fact that even in The Netherlands there exist better and less well-paid activities, and that a relatively large portion of the better-paid jobs are practised in the West of the country. Over there nearly all the regions belong to

the class 105-114 or higher on the right-hand map. The only real 'poor' exceptions are Leiden and Amsterdam; the latter at that time slid down to 'the nation's poorhouse'. Positive figures outside the West can be found on the right-hand map only around Arnhem, which is in fact an eastern extension of the north wing of the Randstad; around Eindhoven; the attractive landscapes on the southern edge of the northern mini-metropolis Groningen; and in the three IJsselmeer polders, which are the most productive agricultural areas in Western Europe.

Map Eighteen

POPULATION LIVING IN SMALL SETTLEMENTS, 1971

Dispersal of the population in the most detailed form is only registered in The Netherlands by a census. Only then is the number of inhabitants counted per part of each municipality. This occurred last in 1971 (owing to the cancellation of the 1980/81 Census), but is took almost ten years before the information referred to here became available.

The purpose of this map is to give a picture of the spatial differentiation of the population living either in the smallest nuclei or even so scattered that there is no nucleus to speak of any longer. The Central Bureau for Statistics uses 15 inhabitants as a lower limit for a nucleus, which given the average family size comes to about five dwellings. The upper limit amounts to a population of 500 for the smallest units, followed by the categories 500-1,000; 1,000-2,000; 2,000-5,000 and so on. If the inhabitants of all these nuclei are added together a group of people are left over who live 'dispersed', i.e. in isolated houses or groups of houses containing less than 15 people. These 'scattered dwellings' accounted for 7.9% of the total Dutch population in 1971, exceptionally high for a country that has been urbanised for so long. However this percentage already ranged from 3.0 to 17.7 for the eleven provinces.

In the map the population in the nuclei of 15-500 and 500-1,000 have also been added to the 'scattered' category because below the level of 1,000, nuclei are frequently too small to include a single shop; nor is a primary school with six classes viable, given the share of the population in the age group 6 to 12 years. Nationally only 2.8% of the population lives in hamlets of 15-500 people and 3.3% in places numbering 500-1,000, added together less than the national average for 'scattered dwellings'. However these totals also reveal a considerable range between the provinces, 1.3-9.9 and 1.3-11.0% respectively.

To reproduce all three variables on the page the spatial differentials must be limited to the provincial level, the more so as each of these three variables is shown in the two dimensions indicated in the key. This already led to differences in the size of the rectangles that could barely be placed within the boundaries of some provinces, so that smaller regions were out of the question. Not recorded in the key but above each bar in brackets is the number of nuclei existing per province in each of the two classes of nuclei.

The most striking element on the map is the great difference between the provinces in the 'scattered dwellings' category, particularly in absolute size (horizontal axis). Of all the 1,035,510 Dutch people residing in this way 249,000 (or 24%) are to be found in Gelderland alone. To this can be added 170,000 in Brabant and 165,000 in Overijssel, bringing the total to 55% in the three provinces that together contain only 33% of all the population. This remarkable spatial concentration on the eastern, and to a lesser degree the Brabant sandy soils, is not a recent phenomenon. On the contrary it is a historically developed pattern that has survived into the present. The explanation must be sought in historical geography but has not yet been satisfactorily provided. Certainly the eastern and southern sand areas are the only part of The Netherlands where a feudal structure originated in the Middle Ages and did not disappear, as elsewhere, after a few centuries but remained until the beginning of the nineteenth century. The rural nobility allowed private development but did not directly promote it. This was certainly possible in the highly habitable micro-relief of these regions. The fact that the percentage of 'scattered dwellings' is much lower in Brabant than in Gelderland and Overijssel is related to the much swifter population growth in Brabant in the last 100 years. It is

also noteworthy that in these three provinces with such a high level of dispersed settlers, a particularly low percentage is to be found in the nuclei numbering less than 1,000, namely 5-6%. This is barely less than in both Noord- and Zuid-Holland and Utrecht where these low percentages are influenced by the high proportion of large cities, which are scarce in Overijssel, Gelderland and Brabant. For the rest there are also in both Noord- and Zuid-Holland about 90,000 people living in dispersed settlements, not in connection with 'sandy soils' and long-term feudalism but because of the dispersed occupancy as a result of fen reclamation and empoldering.

In all provinces the absolute number of inhabitants in the nuclei with 15-500 inhabitants is small. Only in Friesland is it above 50,000 owing to the numerous old 'terp' villages in the relatively extensive sea clay area. This group forms about 10% of the provincial population, a level that is only attained elsewhere in Drenthe. However these, together with Zeeland, are the only provinces where no single town has as many as 100,000 inhabitants.

Friesland has a much higher percentage of its inhabitants in the category 500-1,000 than anywhere else for the same reason as mentioned above, although it is comparable with Gelderland, Brabant and Limburg in absolute size, 50,000-60,000. However in Gelderland the shares of both groups of mini-nuclei pale into insignificance beside the 'scattered dwellings' category. Brabant and Limburg together have a quarter of all Dutchmen in each of both groups. Perhaps this is a consequence of the deliberate policy of the Catholic clergy who did not like to see their faithful leave their parishes, even if they worked elsewhere.

If the eleven provinces are placed within a graph in which the x-axis shows the percentage strength of the 'scattered population' and the y-axis that of the nuclei with 15-1,000 inhabitants, then eight of the provinces show the same tendency. Overijssel and Gelderland deviate with 'much too much' and Limburg with 'too few' 'scattered dwellings'. A special challenge remains here for the historical geographers.

Map Nineteen

BENEFICIARIES OF UNEMPLOYMENT AND WORK DISABILITY PAYMENTS, 1978

The 'Employment Disability Act' (WAO) was introduced in 1967 in The Netherlands to provide better protection than the then existing laws against accidents at work and subsequent resulting disablement. The expectation was that ultimately as many as 150,000 people would receive an allowance in compliance with the WAO. This maximum estimate was already exceeded three years later by almost 40%: in 1970 the number of WAO recipients amounted to 215,000 people nationally. The total reached 374,000 in 1976, when parliament found it necessary to introduce yet another law, the 'General Employment Disability Law' (AAW). The latter had the character of a so-called 'national insurance', that is to say, a minimum allowance applying to everyone, while the WAO was only intended for employees and the self-employed. The total number unfit for work developed as shown in table 19.1.

The foreign reader should realise that in 1984 the working population in The Netherlands numbered 5.9 million, 3.9 million men and 2.0 million women. This included not only those who were actually practising an occupa-

Table 19.1. *Number of people (× 1,000) unfit for work.*

Year	Old regulations	WAO	AAW	Total	Unemployed (for comparison)
1976	52	374	90	516	200
1978	43	435	134	612	210
1980	35	486	159	680	320
1982	28	516	179	723	660
1984	22	540	210	772	820
1986	17	552	227	796	700

tion, in employment or self-employed, but also the unemployment, who in that year amounted to more than 800,000 people, so that about five million people were actually earning money, either full-time or part-time. Therefore alongside the latter two groups existed nearly 800,000 'people declared unfit for work'. The Netherlands, it could be concluded, had thus recently engaged in a terrible war and/or experienced working conditions with a dramatically high risk of workers becoming invalids.

As these last two conditions were not valid, the only conclusion remaining is that the WAO was applied 'improperly' on an enormous scale, resulting in hundreds of thousands of people being incorrectly declared unfit for work. This has been done by doctors carrying out the medical examinations and assessing the degree of unfitness as designated by the WAO. Unfitness for work can be temporarily declared for 0-20, 20-40, 40-60, or 80-100%. Indeed 86% of those 800,000 fall into the last most serious category. It is furthermore notable that in 1978 of those employed nearly everyone was to be found in the 80%-100% category, yet amongst the self-employed it was less than 50%.

Such absurdities are traceable to one cause, which is the misuse of the WAO to avoid those who become unemployed being condemned to the allowance payable under the unemployment laws, which is 'only' 80% of the last-earned income over two and a half years, dropping thereafter to the minimum wage. The WAO benefit, in contrast, is received until pensionable age and is, furthermore, index-linked. This abuse crept in after the industrial employment opportunities began to deteriorate in the second half of the sixties. This was primarily caused by the nominal wage rising more steeply than work productivity every year from 1964. Therefore more and more firms, and ultimately even whole classes of firms, got into difficulties as wages formed a greater share of costs. On top of this came the impact of competition from other member states of the European Economic Community and also of some developing countries. In a small number of cases a disappearing demand had to be contended with as well, such as in the case of coal. This process led to the closure of enterprises, a decision with which the unions were willing to agree more readily if the employees could be provided with the financially more attractive safety net of the WAO instead of the hard mattress of the unemployment benefit. To achieve this legally it was only necessary to have the at least tacit consent of the government and the joint co-operation of the examining doctors.

The need for this safety net was differentiated regionally. In other words examining doctors may have been more inclined to give the benefit of the medical doubt to those becoming unemployed in regions where little or no prospect existed of alternative employment (unless such employees were willing to move house, but this theoretically supposed spatial mobility was in practice a thing of the past in the seventies in The Netherlands).

Two categories of 'redundancy' are depicted on the map by means of percentage block symbols. It can be seen first of all that in all 40 regions the category WAO is greater than the percentage of the officially registered unemployed. The WAO values also exhibit greater regional differences than those of the unemployed, although the opposite would be expected, perhaps with the exception of southern Limburg where in 1978 all twelve coalmines had been closed, a type of employment carrying a higher invalidation risk than other kinds of industrial work. This is not a likely explanation for the second region with an extremely high WAO value, namely east Groningen where the reorganisation of the predominating cardboard industry took its toll, an obvious reason for a high unemployment rate (which is however only 3.7%) and not for a high rate of disablement (running at 9.6%). Elsewhere in the northern Cinderella region a WAO percentage of about 7 is normal just as in the rest of Limburg. The North and Limburg are indeed the regions which were supported by the state through the regional policy, not because so many people had become unfit for work but because of the high number of unemployed. That is not confirmed on the map however: in most of the northern regions the percentage of unemployed is not higher than 2 or 3. In short all kinds of logical suppositions to elucidate this map fail because reality does not tally with the legal conceptual definitions.

If it is assumed that the risk of becoming unfit for work cannot differ regionally within The Netherlands, the real level of this disability can best be determined in the regions with the lowest WAO rating. This is 3.5% in the east of Zuid-Holland. If this variable was to be mapped on the basis of the 80 nodal, or even

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the 129 economic-geographical regions, rather than 40 regions, then that minimum figure would not appear as 3.5% but barely 2%. The regional 'over-value' above this 2% is, therefore, in fact unemployment which is camouflaged by the WAO qualification. This greater or smaller camouflage (more correctly, to be qualified as deception) is determined by the opinion of the examining doctors. This factor, as has been suggested earlier, is liable to be influenced by the perspective of alternative employment. Where this prospect is bad, doctors are more inclined to shunt the redundant person towards the financially more attractive WAO. However, this supposition does not tally in many regions with the quotient of Payment Receiver (PR) and Registered Unemployed (RU) shown on the map. The highest quotients are even to be seen in regions with an outstanding and varied economic structure, such as Haarlem, Het Gooi, IJmond and Utrecht. These high quotients are the result of low RU percentages and incompatibly high PR values. In other words the examining doctors in these regions have practised WAO deceit on a larger scale than elsewhere. The opposite occurred in, for example, southeast Drenthe where the percentage RU along with that in south Limburg is by far the highest of all regions and yet the quotient is lowest, namely 7.3 : 4.7 = 1.6. The examining doctors in southeast Drenthe have awarded WAO to a relatively small amount of the many unemployed, despite the fact that in this outpost of The Netherlands the prospect for other work is much worse than in more centrally situated regions.

All in all this map demonstrates how high unemployment can be hidden for political reasons by labelling a large part of this politically negative phenomenon with a socially laudable heading.

Map Twenty

INVESTMENT BY PRIVATE INDUSTRY, 1971-76

Investments differ from year to year and even more so as the area of their occurrence is smaller. In order to obviate to some extent these two drawbacks of time and space the areas in the map are not smaller than provinces and the period extends over 6 years. The latter is however divided into twice three years with the last day of 1973 as a deliberate dividing line. It was expected that the willingness to invest, even in the industrial sector, before and after this date would clearly be different, because between the middle and the end of 1973 the price of crude oil rose from around $2.50 to more than $10 per barrel through the OPEC cartel. Moreover in November 1973 an oil boycott was declared by the Arab oil-exporters against only two countries, namely The Netherlands and the USA. In the smaller Netherlands this led immediately to motor-free Sundays and, at the beginning of 1974, to petrol rationing. In addition The Netherlands has a relatively large oil-processing industry, which accounts for an even greater part of industrial investment. In 1973 The Netherlands also possessed a disproportionally large energy-intensive manufacturing sector, as much because of the large refinery sector as because of its own abundance of natural gas. Such activities as these would immediately suffer the disadvantages of the enormous price rises for all forms of energy, although large investment cannot, of course, be made to respond in the short term to such far-reaching and unexpected occurrences as took place in the second half of 1973.

The effect of these events on national investments is demonstrable, to be sure, but is nevertheless only moderate at best because in 1971 and 1972 a certain restraint existed in the undertaking of such investments, though the causes were different from those after 1973. This is seen in table 20.1.

These figures also set off the absolute amounts in the title of the map. The amount for 1974-76 is in real terms lower than that for 1971-73 but it does not differ so much because of the influence of the years 1971 and 1972. The inertness of the adjustment of investments is most apparent on the map in Zuid-Holland, where almost the whole oil-processing of The Netherlands is located. The share of Zuid-Holland became somewhat higher in the second period. This can be connected with another important event in 1973, when on 13 November (at almost precisely the moment that the oil boycott against The Netherlands was declared) parliament accepted the Selective Investments Regulation Law

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Table 20.1. *Gross investments in fixed assets in the private sector (excluding housing).*

Year	Index 1970 = 100	% change	Year	Index 1970 = 100	% change
1970	100	11.3	1974	103	0.9
1971	101	−2.3	1975	95	−6.2
1972	92	−6.1	1976	92	−3.4
1973	103	11.5	1977	107	13.5

(SIR). This aimed at binding investments to limiting conditions in the West of the country and particularly in Rijnmond (the harbour area of Rotterdam) and even to levies in Rijnmond itself. This law was not brought into effect immediately however. This might have caused an acceleration of the decisions to speedily invest in this threatened region, at least in 1974, but not in 1975; it was clear by then that the SIR would either be enacted in a very watered-down form or not at all.

Investments in Zeeland were the most reduced in percentage terms. Zeeland's share in itself was still large in the years 1974-76 if it is appreciated that this province only accounted for 2% of all Dutch manufacturing workers. Zeeland, industrially small-scale, saw a remarkable number of large manufacturing plants established there around 1970, nearly exclusively along the maritime access road to the Belgian ports of Antwerp and Ghent. Most of these plants (Pechiney, Hoechst and Total to the east of Vlissingen and Dow Chemicals at Terneuzen) are very energy-intensive, so that a set-back in such investments after 1973 was likely. That does not alter the fact that a great deal of these factories had begun operation before 1973 and that consequently a fall-back would also have appeared without the oil crisis.

The decline in north Brabant is in an absolute sense of the same order of magnitude as in Zeeland but in percentage terms less striking. However this province is simply poor in energy-intensive companies, so that the investment tempo was somewhat quieter after an unusually hectic industrialisation in the sixties. At that time Brabant emulated Zuid-Holland as the greatest manufacturing province, both containing 19% of all Dutch industrial workers in 1974.

Three provinces are the large percentage winners on the map and in all three this must be largely ascribed to the regional policy. Yet in absolute terms the shares of Friesland and Drenthe remain modest. However Limburg rises to fourth place in 1974-76, owing to the enormous efforts of the government to generate replacement employment to compensate for the closing of the coalmines.

Map Twenty-One

ORIGIN AND DESTINATION OF ROTTERDAM CONTAINER TRAFFIC, 1979

This is the only map that does not show The Netherlands but the whole world. This world image, however, converges on and diverges from The Netherlands, or more accurately, Rotterdam, since 1962 the largest port in the world in terms of incoming and outgoing goods tonnage handled.

First of all it must be underlined that no coastline exists anywhere else in the world outside The Netherlands where so many goods are exchanged between land and sea over a length of barely 400 kilometres: around 300 million tons in the seventies, apart from about 70 million tons from and to the Belgian ports of Antwerp and Ghent which also go by way of this coast. Here lies the world's most intensively used contact zone between land transport networks (i.e. with the hinterlands) and the sea (with the overseas 'forelands'). Of all these transhipments 80 to 90% go by way of Rotterdam.

Container transport was first registered in The Netherlands in 1968. In 1979, the year with which the map is concerned, there were nearly 1.2 million containers loaded or unloaded in Rotterdam alone, that is to say an average of almost 5,000 per day. If all Dutch ports are aggregated, then it appears that 95% of the incoming and outgoing transport in this modern form goes via Rotterdam. These con-

tainers are transported into and out from the hinterland not only by truck and rail but also increasingly by inland shipping along the Rhine, Maas and the interweaving system of tributaries and canals, which were the origin of Rotterdam becoming the gateway of Western Europe.

If the number of loaded and unloaded containers recorded on the map are counted, it will be observed that these totals diverge little from each other, namely 599,000 and 587,000 respectively. This equilibrium does not hold good however for the separate macro-regions, which are singled out on this map. Western European destinations account for 46% of all containers loaded in Rotterdam but only 38% of all unloaded containers. This surplus in loading is neutralised by surpluses in unloading in the extensive traffic with the USA and Canada and with Eastern Asia. This presumably has to do with the growing position of Rotterdam as 'main port' for the whole of Western Europe. As the special container ships become larger and more expensive, and are in the hands of a small number of shipping companies, the trend of obtaining as many sailing hours from these ships as possible and of calling at as few harbours as possible is consolidated. In other words the containers are brought and collected at a small number of well-equipped ports, which are used as a distribution centre for these containers. Thus many containers from the USA with various destinations in Western Europe are unloaded at Rotterdam to be directed further afield, whether inland, or increasingly overseas in small container ships, or RO-RO ships or 'ordinary' merchant vessels. This is confirmed by the figures; between 1972 and 1980 the total through-traffic in Rotterdam rose by 40% but the sea-to-sea through-traffic by 70%.

In 1979 between all USA ports and Rotterdam there were 55,000 more incoming containers than were shipped out from Rotterdam. This difference amounted to 15,000 with Japan and only 8,000 with Hongkong. Conversely Rotterdam sent 22,000 more containers to the United Kingdom than it received from there. The differences in the case of Australia is also remarkable: 15,000 shipped out from Rotterdam to Australia but none received from there.

Given the nature of the freight which is transported solely or preferably by container, the spatial concentration on the map corresponds to expectations: 46% of the shipments out of Rotterdam were destinied for Western Europe, 23% for the USA or Canada, 12% for Southeast and East Asia, and 7% for the Middle East (excluding Israel). The percentage for shipments to Rotterdam were respectively 38%, 33%, 16% and 5%.

The difference between empty and full containers is not singled out on this map. Of the containers unloaded in Rotterdam no less than 98,000 out of 587,000 were empty, and came mainly from the United Kingdom (31,000) and the Middle East (29,000). Among all containers loaded in Rotterdam (599,000 in 1979) only 49,000 were empty, of which 17,000 went to the USA alone, and as many again to the United Kingdom, France and the German Federal Republic together.

In conclusion there are two peculiarities on the map. First the enormous significance of Rotterdam as a loading point for the United Kingdom. More than 20% of all shipments out go 'just the other side', that is to say to the British North Sea ports, and of these 114,000 containers only 5,000 were empty. This is presumably one of the centres of gravity of Rotterdam's sea-to-sea through-traffic, simultaneously indicating that the British ports, including London, possess little accommodation for large container ships, although container traffic is considerably developed as such in the United Kingdom, observably from the number exchanged by this country with Rotterdam alone. The second remarkable point is the great size of the Gulf of Cadiz ports in Spain. While the separately given Mediterranean and Atlantic ports of Spain maintain only small container connections with Rotterdam, there were 32,000 containers loaded for these Gulf of Cadiz ports, of which none were empty, and 24,000 returned to Rotterdam, of which 3,000 were empty. There seems to be no explanation for this phenomenon, especially for all these shipments. What can there have been concealed in these tens of thousands of containers which landed in this economic outpost of Spain? Indeed Rotterdam also maintains a container traffic link as great as that with all four Scandinavian countries together with the economically still weaker Portugal according to the map. In 1979 Spain and Portugal were not yet members of the European Economic Community!

Finally it must be noted that, although Rotterdam is far and away the world's largest port, it takes second place as a container port. Number one is Kobe in Japan.

Map Twenty-Two

PUBLIC EXPENDITURE ON CULTURAL AND RECREATIONAL FACILITIES, 1975

Which tier of government is responsible for these expenditures, whether national, provincial and/or municipal, is not indicated. Their share changes by sector of expenditure, five of which are depicted. Moreover the original source of the statistical material does not state whether a higher tier of government has also subsidized the expenditure of another lower tier, let alone to what degree this may have occurred.

The expenditure is expressed for each province by sector as a percentage of the average for all provinces in this sector. Thus it can be seen what priority is given to which sector in each province. The greatest difference between the most generous and the most frugal appears in the *preservation of monuments*, ranging from the maximum of 190% in Zeeland (with Friesland as a high-scoring second) to the minimum of 50% in Zuid-Holland, a level marginally lower than that of three other provinces. Of course this is first of all related to the very great regional difference in the number of monuments and even more to their character. The restoration of an old mill obviously costs much less than the restoration of an historic church. To give an indication of the situation, there were 40,000 buildings on the official List of Monuments in 1975, of which 2,400 were churches, 5,000 farms, only 1,000 mills, less than 300 castles but 28,000 domestic buildings (of which nearly 10,000 were in the province of Noord-Holland, predominantly in Amsterdam. It is not possible here to give a further distribution of this heritage of buildings by province.) The great difference in expenditure in this sector between the provinces is secondly also influenced by the low amount that is allocated per head for this purpose, namely only *f* 17 averaged over all the provinces. This figure was *f* 18 for libraries, *f* 29 for the performing arts, *f* 46 for open-air recreation and *f* 53 for sports. At such a low amount as *f* 17, a few guilders more or less quickly leads to large percentage differences.

The gap between the maximum and the minimum was also great in the *performing arts*. Two provinces, Noord-Holland and Groningen, stood head and shoulders above the rest. This was more surprising in the case of Groningen than in that of Noord-Holland because the latter is strongly influenced by Amsterdam with all its pretensions as the cultural capital of The Netherlands.

The least disparity is found in the provincial percentages for the relatively high-cost *open-air recreation* provision, apparently a generally acknowledged field of policy for governments. The differences between the provinces are actually smaller in the case of *sport*, were it not that one of the eleven, Drenthe, towers far above the others. This can easily be ascribed to a chance project of great expense in this province of only 400,000 inhabitants, for instance the artifical ice rink installed in the capital Assen during the financial year in question.

Only *Groningen* scores higher than 100% in all five sectors. This province also exhibits the highest balance that results if all the positive values above 100 are reduced by all the negative values below 100. The poorest balance is to be found in *Limburg*, where all five sectors are lower, or much lower, than 100. This fivefold negative score also applies to *Noord-Brabant*, but the balance is less negative. Just as negative is the score of *Gelderland* which only reaches 100 for libraries. These last three provinces have a much worse balance than all the others. If these balances are traced from bottom to top, then there is a considerable gap between Gelderland and Brabant on the one hand and *Zuid-Holland* on the other. This province has by far the largest number of inhabitants, so that government expenditure per capita tends to be low.

The top of this ladder of balances is occupied by *Groningen, Drenthe* and *Friesland.* One might be inclined to attribute this excellent standard of provision in these three provinces to the regional economic policy they had enjoyed over the twenty years prior to 1975. However this supposition does not tally in *Limburg*, where regional support had been given on a large scale over the preceding ten years in 1975, while this province nevertheless scores poorest on the map. The high levels of expenditure in the Northern Netherlands must presumably be attributed at least in part to the readiness of their own provincial and municipal authorities to allocate liberal sums of money to these sectors.

Map Twenty-Three

SOCIAL DEPRIVATION, 1971

In 1980 the government's Social and Cultural Planning Bureau published a listing of Dutch neighbourhoods and municipalities according to their social deprivation (Kool 1980). In this publication, the concept of 'social deprivation' encompasses 'a situation in which one occupies a low position with regard to one or more characteristics that are considered as indicative for the share one has in the distribution of rights to scarce social goods' (p. 7).

The characteristics selected as variables by the Bureau for this purpose were the percentages of:

(a) all employed persons with elementary education only;
(b) all employed persons with secondary or higher education;
(c) all household heads and singles falling within the social group of 'higher employees';
(d) all household heads and singles falling within the social group of 'labourer with an annual income of less than *f* 12,000';
(e) all household heads and singles without an occupation, living solely from benefits under the AOW or AAW Act, possibly supplemented by relief benefits;
(f) all occupied household heads and singles earning less than *f* 8,000 per year;
(g) all employed persons owing a private car;
(h) all household heads and singles having a telephone;
(i) all dwelling units with a rateable value of less than *f* 480/year;
(j) all dwelling units without a bath;
(k) all day-education recipients following secondary and higher education.

These 11 indicators were reduced to one yardstick ('social deprivation') by means of principal component analysis, interpreting the first unrotated component as 'social deprivation'. This component accounted for 55.8% of the total variance, the subsequent ones for 11.8% and 10.6% respectively. The loadings of the separate indicators on this component are satisfactory, ranging from 0.93 (b) to 0.59 (j), which is amply above the acceptable minimum. The measure of 'social deprivation' is not dominated by only a few individual indicators, but is determined by quite evenly spread contributions of the different indicators. This is confirmed by the following factor score coefficients, serving as 'weights':

(a)	0.14245	(e)	0.11053	(i)	0.10639
(b)	-0.15120	(f)	0.10238	(j)	0.09619
(c)	-0.13681	(g)	-0.11422	(k)	-0.10163
(d)	0.13407	(h)	-0.12794		

The more positive the score, the greater the 'social deprivation', and vice versa.
Factor scores of neighbourhoods have been aggregated into scores of municipalities, taking into account the number of inhabitants. Although the size of the map allows for showing the individual municipalities, preference has been given to the next higher level of areal aggregation, i.e. the 129 nodal regions (official combinations of municipalities), for which the factor scores have also been calculated by the Social and Cultural Planning Bureau. Using these larger units has the advantage of decreasing the significance of changes that have undoubtedly taken place since the Census was taken in 1971. Such changes in time can be expected to be larger as the areal units are smaller, the more so since the most important changes within the present framework concern the lodging of foreign labour within specific neighbourhoods of the larger cities and the out-migration of Dutch middle and upper classes from the cities to adjacent and non-adjacent settlements.

Reference:

KOOL, C. (1980), *Sociale achterstanden in wijken en gemeenten; rangorde van Nederlandse wijken en gemeenten naar sociale achterstand op basis van de Algemene Volkstelling 1971 [Social Deprivation in Neighbourhoods and Municipalities; Ranking Order of Dutch Neighbourhoods and Municipalities by Social Deprivation Based on the Census of 1971].* Rijswijk: Sociaal en Cultureel Planbureau (SCP-Cahier 14).

Map Twenty-Four

PERCENTAGE OF MALES UNFIT FOR WORK, 1977

Details about the WAO and AAW laws are given in the commentary on Map 19 which is referred to here. This map originated because of the growing concern in The Netherlands about the misuse of these two laws, namely that ordinary unemployed people were regarded as unfit for work not because they were actual invalids but only because:

1) they could profit from the higher financial benefits coupled with it, and
2) the politically sensitive unemployment levels could be kept artifically low.

This deception becomes extremely evident if it is measured against the number of younger people as in the age groups from 25-49 years on the map. Younger people naturally run a smaller risk of actually becoming unfit for work. Even smaller is the chance that such young people be declared unfit for work according to the maximum category of 80-100% on the map, which means in practice that they would never have to work anymore until pensionable age, but would be supported by society all these years. In this connection the reader should bear in mind that employees paid less than 2% of their wage as WAO premiums in the years 1968-72, whilst employers paid 3.5-4.1% on the same wage. In 1977 these percentages had risen to 3.7 and 6.1 respectively. However the WAO did not come into operation until 1968, so that this premium had only accumulated a small amount of money, far below that needed to pay for these numerous allowances. The AAW only came into effect in 1977, so that in that year these allowances had to be paid in total by the treasury.

The percentages recorded on the map are represented by Labour Exchange District. These regional offices register the unemployed and try to help them find work. That effort is not necessary in respect of those who are declared 80-100% unfit for work. In addition these people need not be passed on to the national register as unemployed.

Through this chain of procedures the number of people in receipt of various unemployment benefit payments was 208,000 in 1977 but 531,000 profited from the WAO and AAW. This ratio of 1 : 2.5 was less bizarre in regions where the economy fared better but even more distorted in problem regions. In the latter the percentage of those unfit for work, including those from 25-49 years on the map, is not only dependent on the objective economic situation but also on the subjective judgement of examining doctors based, in other words, on the norm they have gradually taken on as acceptable in their district.

It can be seen on the map that only four of the 129 regions are in the worst class and eight in the next category with a percentage around seven. Of these twelve, six are situated in southern Limburg, where all twelve coalmines were closed down in 1977 and many social security recipients were earning 'black money' just across the border in Germany. In addition and no less coincidentally, five of these regions were situated in east Groningen and Drenthe. Lastly Apeldoorn in mid-Gelderland also belongs to this category, a rather typical case because in this small region a number of factories had dismissed a considerable number of workers in 1977, with the consequence that the number of unemployed did not rise but the number of those declared unfit for work did, including 7.4% of all men in the 25-49 years category.

The eleven regions having to contend least with this mystery of the sudden disablement of men in the prime of life scored about 2%. Nine of these are in Zuid-Holland and one borders it, so that this is apparently a very healthy province, despite the highest level of air pollution, population density, traffic congestion and so on. Also the next category with a percentage of around three on the map includes 33 regions, almost all of which are situated in the western part of The Netherlands, including Zeeland. However among these 33 there are also three regions in Friesland which contrast sharply with the other two northern provinces. Was it so much better there? Or were the Frisian examining doctors less flexible? It is not known, but the proposition can be advanced that in an extreme welfare state, side-effects can occur regionally differentiated.

Map Twenty-Five

LOCAL RESIDENTIAL MOBILITY, 1977

This map is based on an incidental report of the Central Bureau for Statistics about local residential mobility. In its turn the CBS obtained these figures from the municipalities. It is true they work conscientiously in The Netherlands but they certainly do not register every housing change taking place within their boundaries, for the simple reason that those moving house must inform the local authority themselves and, of course, do not always do so. Some just forget and some consciously neglect to do so. That fault occurs especially in municipalities with a large number of higher educational establishments. Many students of 18 years and older live for a limited number of years 'in rooms', a type of accommodation which they change frequently in this period. This phenomenon puts the following higher educational centres in the two highest classes on the map, together containing just 15 + 40 = 55 municipalities: Amsterdam, Arnhem, Eindhoven, The Hague, Groningen, Leeuwarden, Leiden, Rotterdam, Tilburg, Utrecht and Zwolle.

A second blow to the accuracy of the figures shown are municipal boundary changes resulting either in continued existence with an alteration in size or alternatively in total annexation by one or more adjacent municipalities. In 1977, however, only 9 municipalities were abolished, bringing the total down from 842 to 833. This disappearance was limited to the southwestern side of Amsterdam and the western region between the large rivers in Gelderland. The overall impression on the map was therefore not greatly disturbed by this factor.

A third threat to the reliability of the figures, particularly at this municipal microscale, is the coincidental completion of a relatively large number of new houses in 1977, such acquisitions being mostly occupied by existing residents of the municipality concerned (the granting of residence licences is a local authority responsibility). This phenomenon has caused a number of smaller municipalities to appear in the highest categories on the map. A special case consists of settlements receiving government regional policy support of which one of the measures is the building of sufficient dwellings. Thus the stimulation nuclei of Assen, Coevorden, Delfzijl, Emmen, Harlingen, Heerenveen, Hoogezand, Hoorn, Kampen, Roermond, Sneek, Stadskanaal, Terneuzen, Veendam and Winschoten fall into the two highest classes.

There are 102 municipalities in the lowest frequency class (less than 20 house removals per 1000 inhabitants). These are nearly all small, or very small places, only a few having more than 10,000 inhabitants and many numbering only a few thousand. They usually have a strong agrarian character, and farmers seldom move house. Because of their small population size such settlements also contain relatively few young people, a group tending to migrate more often than settled residents, not to mention pensioners. These 'house removal poor' municipalites occur on the map mainly in regional clusters: within the 'Green Heart' of the Randstad, where they contrast strongly with the surrounding darker spots; in the rural regions to the east of the IJssel, which thereby differ sharply in colour from the predominantly darker municipalities in the Veluwe; and in Brabant and particularly Limburg, where the population may confirm its reputation for being 'stay-at-homes' in this way. Particularly notable in Zuid-Limburg is the large number of very small municipalities which nevertheless show very low removal figures, instead of the high ones that are to be expected because almost any removal is likely to be across a municipal boundary and thus not recorded on this map.

The map confirms the general unsuitability of the use of municipalities as spatial entities at this scale. Too fragmented a picture emerges, especially if the key contains six classes. This fragmentation is not equally strong all over The Netherlands. The map shows that municipalities with small areas are particularly numerous within the Randstad 'horseshoe', in northern Noord-Holland, and in middle and south Limburg. In Zuid-Holland and Limburg the average area of a municipality was only 20 km² while in Utrecht and Noord-Holland it was 30. Most extensive on average are municipalities in Friesland, Drenthe, and Overijssel: 80 km² or twice the national average area. Not surprisingly therefore the map appears at its most tranquil in those three provinces.

EMPLOYMENT IN AGRICULTURE, 1978

'Employment' in the title only covers wage earners. These form only 30% of all those deriving a livelihood from agriculture including forestry and fisheries. The remaining 70% are self-employed managers (55%) and members of the family (15%).

Forestry and fisheries are almost negligible in size, respectively 1 and 2% of all working people in this sector, so that agriculture in the strict sense of the word overwhelmingly determines the national picture, even if the contribution of forestry or fisheries is rather greater in some of the 127 small regions used here.

The symbols on the map account for 68,500 wage earners. Of these about 3,000 are employed in fisheries or forestry, while the remaining 65,000 are genuine agricultural workers. In 1978 there were about 150,000 farm units throughout The Netherlands. It follows that most of these do not employ labourers and are therefore purely family concerns.

Large differences exist in labour requirements within the agricultural sector. Because of extreme mechanisation this is in general low in the 98,000 animal husbandry units, the 16,000 arable farms and the 8,000 so-called mixed enterprises. However, the labour requirements per hectare are high in the 30,000 horticultural units. Among these the 12,000 greenhouse businesses in particular have a very labour-intensive production, without much seasonal variation as the weather and climatic influences are virtually eliminated by the glass.

Agricultural statistics distinguish at least six classes of labour requirements. It is not possible to go into this further here. Suffice it to say that almost 40% of all horticultural units fall into the highest, that is the most labour-intensive, class, although they account for barely 20% of all agricultural units. These percentages are 25 and 8 respectively for the greenhouse subsector.

This great difference in labour requirements in each sector of agriculture explains the map picture in broad terms because horticulture, particularly under glass, is highly regionally concentrated in The Netherlands. Nineteen percent of the total Dutch area under horticultural crops, and 64% of all horticulture under glass, lies in the province of Zuid-Holland. The adjacent region in Noord-Holland increases this concentration still further. This striking spatial concentration culminates in the famous Westland, the small triangle west of the line Rotterdam-The Hague. This forms the world's most concentrated 'glass city', where no less than 50 of the 680 symbols on the map are to be found in such a small region that most of them had to be drawn on the sea.

It is paradoxical that most agricultural labourers are to be found in the most urbanised part of The Netherlands. The explanation is nevertheless simple. These towns initially formed the market for the horticultural products. Their production locations were not moved when these crops were increasingly exported, owing to the spatially immobile influence of the whole agri-business complex that grew up around horticulture.

The second much more diffuse area with many agricultural labourers on the map, namely east Brabant and north Limburg, was from the beginning directed at export to the nearby urban markets of the West German Federal Republic. This is not only a reflection of considerable horticulture but also of the bio-industry, about which information was supplied with Map Two.

Finally there are relatively numerous symbols in the new IJsselmeer polders. The North East Polder scores remarkably highly owing to The Netherlands' most remunerative concentration of fisheries on the former island of Urk that was incorporated into this polder, while in Flevoland numerous agrarian wage-earners were still employed in its reclamation in 1978.

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Map Twenty-Seven

RESIDENTIAL ORIGIN OF MEMBERS OF PARLIAMENT, 1981

The Dutch parliament has had two chambers since the French Occupation (1795-1813). As the name implies the First Chamber was at the outset more important than the Second. Through several alterations in constitutional law over a century this division of role has been completely changed. At present the First Chamber may only accept or defeat the bills which the Second Chamber has passed.

Until 1917 the members of the Second Chamber were chosen by means of a constituency system such as exists in the United Kingdom. Then this geographical framework with a direct election of a regional representative at a national level was abolished and replaced by a system of proportional representation, by which all voters record their vote for a national party. These parties draw up their own list of candidates for the parliament. The larger parties strive for spreading these candidates on a regional basis to some degree over the country, but that is formally not necessary and is practically impossible for the smaller parties.

How far such a regional spread is achieved can be seen on the map. Moreover it is taken for granted that the political behaviour of a member of parliament living in region X would be influenced if interests of this region are being pleaded in parliament or are in need of defence, provided that this is not irreconcilable with the national party interest.

The East and South appear underrepresented (Table 27.1), whereas both the Holland provinces are more strongly represented in the Second Chamber than is merited by their population size. This could be partly caused by the fact that members of parliament living far from The Hague also maintain a residence in this centre of government and have let that address be recorded in the source used for this map.

The distortion mentioned above does not apply to the First Chamber, in which membership forms a far from full-time job. Yet Zuid-Holland is also nearly 1.5 times as strongly represented in this body compared with its 22% share in the whole Dutch population. Nevertheless the possible intertwinement of regional interest and political behaviour of the members of the First Chamber is much weaker because this institution is not a policy-making body nor can it even adjust policy. This constitutionally modest task neutralises the influence of the provinces despite the fact that every three years 38 and 37 members respectively step down and are elected (anew) by the members of the *Provincial States*, namely the provincial parliaments. Moreover the provincial voters are divided into two groups. The 37 members of the First Chamber are elected by the provinces Groningen, Drenthe, Overijssel, Gelderland and Zuid-Holland. The other 38 are chosen, three years later, by the remaining six provinces. Members of the First Chamber can in theory be members of a provincial parliament but that is not often the case.

Table 27.1. *Distribution of population and Second Chamber members 1981 (percent).*

	Population	Second Chamber members
Groningen	4	6
Friesland	4	3
Drenthe	3	4
Overijssel	7	4
Gelderland	12	8
Utrecht	6	7
Noord-Holland	16	20
Zuid-Holland	22	29
Zeeland	2	2
Noord-Brabant	15	12
Limburg	8	5

Map Twenty-Eight

PROVINCIAL PREFERENCE FOR NATIONAL NEWSPAPERS, 1981

The leading daily newspapers referred to here are the national daily newspapers whose circulation area is in principle the whole country, as opposed to the regional daily newspapers of which there are far more in The Netherlands and which together also have a greater circulation than the nationals.

There are ten general national daily newspapers in The Netherlands, of which only the communist paper *De Waarheid* does not

provide national circulation figures, or even provincial ones. Two orthodox Protestant daily newspapers, *Het Reformatorisch Dagblad* and *Het Nederlandse Dagblad* are also excluded from consideration, be it for other reasons. They each have a very small circulation, 47,000 and 24,000 respectively in 1981, and furthermore are extremely dispersed over the provinces.

The remaining seven national newspapers consist of four morning newspapers (upper four maps) and three evening papers (lower three maps). The morning papers have together a much greater circulation than the evening papers, 76 and 24% respectively of the total. This arises because of the existence of a flourishing regional press, which consists almost totally of evening papers.

Within the subgroup of the three evening papers each paper is almost of the same size, about 7 to 9% of the total circulation of the seven. Amongst the morning papers there is one relative giant, namely *De Telegraaf* which alone has 37% of the total circulation of the seven and is twice as large as the second, the *Algemeen Dagblad*. Both are 'popular' newspapers, 'the press the public wants', as is the evening *Nieuws van de Dag*. The smallest morning paper *Trouw* (8%) and the evening paper *Parool* of comparable size have an ideological character, namely Protestant Christian and socialist respectively. These two are also the only ones out of the seven that originated as so-called 'illegal papers' during the German occupation from 1940 to 1945. The remaining two are the 'quality press' of The Netherlands although different in content. The *Volkskrant* was for many years after 1945 the newspaper for Catholic workers but has evolved into a non-confessional newspaper for (younger) intellectuals with left-wing views. The *NRC-Handelsblad* is an amalgamation of the two oldest, liberal, and city-bound papers of The Netherlands, the Amsterdam-based *Algemeen Handelsblad* founded in 1828 and the *Nieuwe Rotterdamse Courant* (NRC) founded in 1844.

The differing character of these newspapers makes their regional, in this case provincial, preference geographically interesting, all the more because in The Netherlands, unlike most other Western democracies, the circulation of the national newspapers consists for 80-90% of subscriptions and thus relies only to a small extent on sales of individual copies. A satisfactory explanation for this provincial preference requires taking into account the size and character of the regional newspapers, of which the total circulation is greater than that of the national newspapers.

Here we must be content with some indications owing as much to a lack of space as to the absence of a regional press. The most obvious competition exists between the two 'popular' morning papers, the *Telegraaf* and the *Algemeen Dagblad*. The former sells better than the national average in no less than nine of the eleven provinces, although in only six far above that average. Only in Zuid-Holland and Zeeland is the *Algemeen Dagblad* favourite with the public at large but, in this case, excessively so. For want of other differences between the two, this must be mainly caused by the location of the newspaper. The *Algemeen Dagblad* is produced in Rotterdam and the *Telegraaf* in Amsterdam.

The previously Catholic character of the *Volkskrant* perhaps explains the continuing high preference it enjoys in both the solidly Catholic provinces Brabant and Limburg. Its high score in Groningen and Utrecht, neither of which is a Catholic area could be linked to the relatively high numbers of university students in these two provinces.

The Protestant *Trouw* is naturally scarcely read in Brabant and Limburg. Its preference is notably low in Friesland and Zeeland, given the high share of Protestants there. It appears to be supplanted here by regional newspapers of high quality in these two provinces.

This latter factor also plays a role in the small readership of the *NRC-Handelsblad* in Friesland, while the preference for this paper manifests the least deviations from the national average in the other ten provinces. The widely held view that this newspaper is preeminently read by the political and cultural elite, can hardly provide an explanation for the fairly high preference in the five provinces indicated. Equally significant are the low scores shown by these five on both adjoining maps. Of these two the preference values for *Parool* are the most extreme of all seven. The circulation of this newspaper has become increasingly limited to Amsterdam and its surroundings in the course of the last decades, so that in fact it can hardly be described as a national daily paper anymore, even though its circulation still formed 8% of all seven together in 1985. The *Nieuws van de Dag* also shows low to extremely low scores, be it in less provinces than *Parool* with which it is engaged in fierce com-

petition in Noord-Holland. That is dangerous for the threatened *Parool* because the *Nieuws van de Dag* belongs to the financially strong *Telegraaf* concern.

If these seven maps are viewed by province rather than by newspaper, then there is a considerable difference in the collected rejections and preferences of each. Overijssel has the most 'uniform taste' with all seven index figures a little above or below the hundred. On the other hand Limburg has the most pronounced likes and dislikes. If the positive and negative differences with a 100 per newspaper in Limburg are added up, then the highest score is achieved here, because the Limburgers hardly ever deign to look at four of the seven newspapers but on the other hand enjoy reading the other three. Zuid-Holland and Zeeland also appear very 'profiled' in this way. Zeeland is the only province with just one pronounced favourite as opposed to six negative scores. Noord-Holland is fourth in this line of provinces with a very pronounced taste in newspapers, mainly owing to the very high figures for the *Parool* and *Nieuws van de Dag* and the very low ones for the *Algemeen Dagblad*, exactly opposite to the picture found in Zuid-Holland.

Map Twenty-Nine

FOREIGN INHABITANTS, 1980

People with diplomatic immunity and military personnel with their families who are stationed in The Netherlands with NATO are not included in the total number of 473,000 non-Dutch nationals, equivalent to 3.4% of the total population.

Two main groups of foreigners are functionally distinguished which also explains their spatial distribution: the manual workers for unskilled and/or 'dirty' work in industry and some services, and the others. The manual workers came in great numbers after 1960, when The Netherlands had already enjoyed full employment for some years. They were initially recruited through contracts under the supervision of the Dutch government with the governments of the countries of origin. Later they came in increasing measure individually. Chronologically the Italians arrived first (in the 1950s), followed by the Yugoslavs, Spanish and Portuguese. In 1980, the year covered by the map, these four groups still formed 4, 3, 5 and 2% respectively of all foreigners, modest shares because many in the meantime were repatriated. The Turks and Moroccans mainly came in the late sixties and in 1980 formed 25 and 15% respectively of all foreigners recorded on the map, considerable amounts because they were later given the opportunity to have their families brought over to The Netherlands.

On account of the sort of work for which they were recruited, these workers are to be found mainly in the regions and towns having (then) considerable labour-intensive and/or low-wage industry, such as the Zuid-Limburg coalmines; the textile industries in Twente and Brabant; assorted industries in Amsterdam with adjoining Zaanstreek and IJmond; in Rotterdam together with the upstream and downstream regions; and in Utrecht, Arnhem and Nijmegen.

While the employment opportunities in Dutch manufacturing industry began to decline from 1966 onwards, above all by the substitution of expensive labour by machines, the number of Dutch workers in industry diminished even more rapidly. Therefore foreigners were still recruited in the first half of the seventies at rates of 60,000-70,000 per year at the peak. Shortly afterwards Dutch manufacturing started crumbling away in the form of plant closures, condemning increasing numbers of foreigners to unemployment. However they were not compulsorily repatriated as prescribed in some other countries. Yet voluntary departure hardly occurred because the very high unemployment benefits (by international standards) in The Netherlands also applied to foreigners. As a consequence more than 20,000 foreigners were out of work in The Netherlands in 1980. That number would quickly rise in the years 1980-1985, when the national percentage of the unemployed rose from 4% in 1980 to 16% in 1985.

The second main group is much more varied from the viewpoint of nationality and also their spatial distribution was different. The West Germans form the largest contingent, namely 9% of all foreigners, and many of them live in the frontier area from Twente southwards. The same applies to the Belgians

(5%), of which 6,000 alone live in Zeeuws-Vlaanderen. The number of British is remarkably high (8%), presumably a reflection of the generally recognized fact that The Netherlands is the most anglophone country on the continent. The opposite applies to the French, whose population size is comparable with that of Germany and the United Kingdom but are extremely poorly represented in The Netherlands, being only 1% of all foreigners. Apart from both frontier zones, the greatest concentration of this main group of non-Dutch nationals is of course The Hague and its environs.

Map Thirty

MARITAL FERTILITY, 1850-1980

Marital fertility as shown here is the number of live births within existing marriages expressed per 1,000 of the number of married women below the age of 45.

The population of the whole of The Netherlands expanded by a factor of 4.6 during the period depicted, despite a negative migration balance. That is a faster growth than in the surrounding West European countries. The cause of that difference is the longer duration of the so-called demographic transition, that is the phase difference between the much longer continued high birth-rate figure and the much earlier start in the decline in the death-rate. For a long time the birth rate, especially, remained at an exceptionally high level in The Netherlands. The fertility rate used here, averaged for the whole of The Netherlands, was higher than 350 until 1890. After 1905 it fell under the 300, falling to under 200 after 1930 and, only after the introduction of 'the pill' in 1964, to below 150.

The provincial variations of this trend in the national average are lowest in the first and the last year of the series shown, as is seen on the map. Between 1850 and 1890 they became somewhat greater, but between 1900 and 1931 they reached maximum values. The differences were halved between 1946 and 1971, and in 1979 they were almost as small as 130 years earlier, although the national fertility declined from 355 per thousand in 1849/50 to 88 in 1979. In 1850 there was a large difference between the provinces in the number of men and women that never married, 20% in Brabant and Limburg for both sexes as against 10-15% elsewhere. However this variable is not dealt with in this map, although it had considerable influence on the 'crude' birth rate. What does have much impact on the map is the age of marriage. Up to the end of the 19th century the share of women aged 20-24 years who were already married was only 50-70% of the share of the national average in Brabant and 60-80% in Limburg. For the age-group 25-29 years Brabant did not score higher than 70-80%. This postponement of marriage until after the most fertile years neutralised the ecclesiastical pressure for an abundance of children in the completely Catholic South and in such a manner that until about 1890 fertility there was only a little higher than elsewhere in the country.

That brake disappeared after this period owing to rapid industrialisation, which also provided young people with a basis for sustenance for a family which before 1890 could not have been provided by agriculture. Thus after 1890 marital fertility in the two southern provinces rose dramatically. This situation only changed after 1960 because of a mental urbanisation in general and a rapid decline in the influence of the Catholic Church in particular. Limburg even went from one extreme to another, manifesting the lowest of all provincial scores in the map's last two years.

Counting, with the help of the bars in the map, the annual positive and negative scores per province together, this total appears by far the highest for Brabant, closely followed by Limburg. In both cases this total consists almost only of positive deviations, except in the last two years.

This total is also high in Friesland and Noord-Holland, although both display a very different bar diagram than the two southern provinces and yet also mutually differ. Friesland until 1960 displays exclusively negative and annually strongly varying deviations from the national average. This is very remarkable because this province has always been predominantly agricultural, with a low degree of urbanisation, whilst moreover a greater proportion of all women in the age-groups of 20-24 and 25-29 years old were married than the national average. Consequently birth-

limiting behaviour has existed in Friesland during the whole period. When such behaviour began taking root all over The Netherlands with the arrival of 'the pill', Friesland suddenly started to exhibit the most positive scores of all the provinces. This occurred because after 1960 fertility in Friesland dropped more slowly than in all the other ten provinces. By the same process Overijssel now has, after Friesland, the highest level of fertility, but this province has not the same history of negative deviations during the previous century.

Noord-Holland is the only province where fertility was lower than the national average in all the selected years. Until 1890 it was a little lower and thereafter up to and including 1930/31 much lower. Here too this was accompanied by high numbers of married women in the 20-29 year age-groups and therefore, with an early and by Dutch standards a rigorous form of birth control, which is not as surprising here as in Friesland in view of the high degree of urbanisation and the dominance in this province of trend-setting Amsterdam.

There is only space here to focus attention on Drenthe, which showed remarkably high positive deviations from 1909 to 1931. This is the consequence of the peat-moor reclamation taking place then, in the promotion of which relatively large numbers of manual workers were drawn from outside the province. In the same period Drenthe also shows by far the highest proportion of married women of all the provinces, especially in the age-groups of 20-24 years and to a lesser degree also in that of the 25-29 years group.

Map Thirty-One

NUMBER OF CATTLE PER HECTARE OF GRASSLAND, 1979

Map Two showed the density of cattle on all cultivated land in 40 not specifically agricultural areas. This map gives a much more accurate picture of this density, namely for the 122 official agricultural regions and only per hectare of grassland.

This density increased in the whole of The Netherlands by 50% in the first half of the twentieth century, and by a further 100% between 1950 and 1979. Between 1900 and 1950 this rise was especially achieved by better species of grass, and from 1930 onwards by the administering of nitrogen fertiliser, to 5 times as much in 1950 as in 1930. After 1950 this nitrogen dressing was increased five-fold once again (from 50 kg per hectare in 1950 to 240 in 1979). In addition grass production per hectare was increased by better drainage, the effect of which was especially great in the relatively extensive parts of The Netherlands with a high ground water level and therefore only suitable for grassland.

An ensuing cause was the replacement of hay-making by the mowing of grass that either is preserved immediately as silage, or is given to the cattle in the stall on the same day. In both cases this results in higher nutritional value. Direct comsumption in the stall is connected with the triumphal progress of the cubicle stable, which began in the sixties throughout The Netherlands. Cattle are housed there in any case at night but increasingly also during the day, in the summer that is, for cattle are always in the stall in the winter because of the climate. This longer or permanent stay in the stall again leads to the consequence that no more grass is trampled upon by cattle freely grazing. This also results in more cattle per hectare of grassland, although it implies more mowing work for the farmer.

Finally the cattle occupancy per hectare has been raised by the ever increasing purchase of imported fodder. This whole development has naturally led to higher costs, which are easily recouped through sharply rising profits. This was especially the case after 1958 when the pricing policy of the European Economic Community further stimulated the existing specialisation in dairy produce in The Netherlands.

The map shows how great the regional differences are within the small area of The Netherlands. Less than two head of cattle per hectare of grassland are to be found only in large parts of Noord-Holland. This is above all caused by also using the grassland here for a great number of sheep. This only occurs elsewhere in Friesland (for reasons which must go unrecorded here) and explains the modest cattle density in a province that more than any other is world famous for its dairy herds. High densities, from four to more than five per hectare, are only found on the southern and eastern sandy soils. Some of the reasons for this

are given with Map Two. Such densities are only possible if a farmer supplements his own output of grass vigorously. That is achieved by importing, as mentioned above, but in addition is obtained from his own arable land. On the sandy soils the so-called 'mixed enterprise' was characteristic until the fifties. The term 'mixed' applied to the land being partly used to produce fodder crops on behalf of the livestock for which the other part was kept in grass. Nationally the fodder crops then formed 6 to 7% of the area of all grassland but this percentage on the sandy soils was many times this figure. From about 1960 this fodder area decreased to barely 2% in 1970 but rose again after that to more than 10% in 1979. Behind these percentages however there was a great change in the kind of cattle fodder. In 1950 that consisted principally of mangold-wurzels and also clovers and lucerne. These types have been completely superseded however in less than twenty years by maize, the cobs of which do not ripen sufficiently in the cool climate of The Netherlands. However the whole maize plant is harvested in its unripe state in The Netherlands and then cut up into a green mass which, just like grass, is ensilaged either in heaps covered by plastic or currently more and more in cylinder-shaped silos. The disadvantage of maize is its one-sided composition, rich in starch but low in protein and minerals, so that a supplement of other fodder is necessary. The great advantages are however an enormous yield with low labour requirements per hectare and the outstanding absorption of animal manure, which originates because of the high density of cattle on account, amongst other reasons of the maize. In 1979 this so-called 'cut maize' had overtaken in terms of surface area all other agricultural crops excepting wheat, a development that had been attained within ten years.

Finally it must be said that 1) the total area of grassland in The Netherlands in 1979 was just as large as in 1900 with less than 10% variation in these 80 years, and 2) the cattle shown on the map consisted of about 45% dairy-cattle, 35% young cattle and nearly 20% beef cattle in the seventies.

Map Thirty-Two

SPATIAL DENSITY OF PURCHASING POWER, 1976

A fourth map about incomes in this publication may seem too much of a good thing but incomes form the most general reflection of prosperity and are therefore also the subject of continuing political importance, resulting in an income policy of each cabinet. That policy also has a spatial component, in the sense that nearly every government strives for less pronounced regional differences in income levels. That was easy to 'sell' until the late seventies with the seemingly ample supply of money, because real incomes were rising continuously and generally quickly, along with the tax yield.

Map One covered the regional changes in gross income per tax-payer in the fifties as opposed to the sixties. Map Two showed the gross incomes in absolute terms and per km² in 1969, although only for 44 regions. Map Seventeen represented the difference between gross and net income in 1974 as a percentage of the national average. Now this map not only depicts the situation after two years of income policy by a socialist government, but also concerns another sort of variable, namely the total purchasing power in the form of net personal incomes in guilders per km². The latter indicates the prospects for economic existence of varying forms of commercial services, as they get distributed in Christaller's central places by means of the threshold and maximum range for each separate service function. Therefore the 80 nodal regions are used here as a framework.

For the sake of illustration the figures for the Arnhem region are given. Its total for all (150,646) gross incomes was ƒ 3,793,564,000. On that ƒ 703,697,000 was paid in taxation, so that ƒ 3,089,867,000 net income (= purchasing power) remained. The surface area of the nodal region of Arnhem is 521 km², so that averaged per km² ƒ 5,930,650 is available to spend in the service sector. That is six million guilders rounded off. This must be depicted by one medium-sized and one small block of the symbols chosen. The location of these two cannot be more exact in this case because the region consists of 15 municipalities. Of these, Arnhem alone has 40% of the purchasing power, but together with all the municipalities adjoining Arnhem this is raised to 65%. Given

the surface area of this agglomeration and the high level of services of Arnhem itself, it is justified to draw the middle-sized block representing five million guilders there. The remaining small block is positioned in the municipality with the greatest purchasing power of those not adjoining Arnhem.

The total picture gained from the map is naturally not independent of the boundaries and surface area of the nodal regions. That is well illustrated by the only two regions with more than *f* 10 thousand million purchasing power, namely Amsterdam and Rotterdam, with *f* 11.1 and *f* 10.4 thousand million, differing little from each other. However their regions occupy 834 and 538 km² respectively and this results in barely 10 as against 19 million guilders respectively per km². Nevertheless this map illustrates once again the sharpness of the A-A line (Alkmaar-Arnhem) and the all dominating position of the Randstad, where the enormous spatial concentration of purchasing power results in an even more disproportional size and variation in the service sector than is already the case based on population size only.

Finally the special position of Zuid-Limburg should be pointed out. In 1976 the decade had just ended during which all 12 coalmines there had closed. The payments from the government to 50,000 formerly well-paid but now unemployed miners maintained a spatial density of purchasing power which is not only conspicuous nationally but also underlines how notably this problem area distinguishes itself from the other Cinderella region, the North of the country.

Map Thirty-Three

CREMATORIA AND CREMATIONS, 1981

In 1981 it was just 25 years since cremation had been legalised in The Netherlands in 1955. At that time 3% of the dead were nevertheless cremated, which was possible because a loophole in the burial law had enabled the foundation of the first crematorium in Velsen as early as 1914. However forty years elapsed before a second was opened (northeast of Arnhem) as a consequence of the legislation mentioned above. As is seen from the map, by 1981 another 19 were added, ten of them between 1970 and 1974.

With the increase in this number, their location began to coincide more with the demand for this form of service, although the distance between the place of death and that of the crematorium used does not affect the cost of the cremation insurance. This demand, in this case this personal decision for cremation, is more interesting in its spatial differentiation than the spread of crematoria and is therefore cartographically emphasised in the map.

The late breakthrough of the legal possibility of cremation is explained by the politically translated resistance of religious groups. This is primarily rooted in the Roman Catholic Church, which has always forbidden cremation on principle until this was revoked by Pope Paul VI in 1964. Because religious affiliation is also always registered in the Dutch Census, it is known from this source that the percentage of Catholics in the Dutch population in 1947, 1960 and 1971 amounted to 39, 40 and 40% respectively. However, because not all Catholics voted for the only Catholic party, it won no more than 32% of the votes between 1946 and 1963. Subsequently it suffered, in Dutch terms, a dramatic, rapid decline, down to 18% in 1972. In the following elections for the national parliament, this percentage is not traceable anymore because the Catholic Party formed a federation with the two largest Protestant Parties in 1975, leading to a merger in 1980.

A second religious force, which rejected cremation, was that of the (Orthodox Reformed) Calvinists. They formed barely 10, 9 and 7% respectively of the national population in the three censuses after the war. Their three favourite parties attracted however, in contrast with the Catholic Party, more voters than was in keeping with the number of these believers, namely 12 to 13%.

The combination of these two religious and political forces was diminished to such an extent at the end of the sixties that in 1968 cremation and burial were put on an equal footing legally, and lower tiers of government were given permission to subsidise the building of crematoria. Hence the great increase in the number of crematoria in the seventies, from five in 1969 to 21 in 1980. According to the

map 36% of all deceased were cremated in 1981, a quadrupling compared with the 9% in the year of the change in the law in 1968.

For a short explanation of the regional differences on the map it is not possible to assess the level of decline in religious belief, especially amongst the Catholics and Calvinists, because no statistical information is available about this after the Census of 1971. The separate political reflection of these religions is also unfortunately missing since these parties joined together in 1975. The collective following of the one Catholic and the two large Protestant Parties has nevertheless declined from about 50% around 1960 to 37% in 1971 and to a plateau of about 30% since then. The weakened grip of the churches concerned on their believers since the middle of the sixties has however more deeply undermined the opposition to cremation than appears from the decline in the number of voters. The only requirement for this mental change seemed to be that cremation was painted as something normal or even desirable on television with deliberate frequency.

However the choice between burial and cremation obviously mainly concerns older people, whose religiously rooted views have changed less quickly than those of the young. Consequently religious persuasion and other variables (such as the degree of urbanisation and agricultural occupation) as they existed in 1971 can be linked to regional differences in the frequency of cremation in 1981. Looking at the map from this perspective the points outlined below can be noted.

The great majority of the 36 regions in the lowest class are situated 'below the great rivers'. In Brabant and Limburg these regions were in 1971 80-100% Catholic. In Zeeland the area to the south of the Westerschelde was also predominantly Catholic but to the north of this estuary strongly Calvinist (20-40%). Only four urban islands scored above the national average here and in three of them a crematorium was situated, be it only since 1976 or 1978. To the north of the great rivers the lowest percentages for cremations are only to be found in regions where Catholics and Calvinists together are numerous and the agrarian work force relatively large (10-20%). The addition of this variable renders it necessary to point out that economically and technically the Dutch farmer is among the most modern in the world. Yet his circle of social relations is not very heterogeneous and therefore not very accessible to innovations with an emotional value like cremation.

The highest scores are naturally to be found in the large cities and in the middle-sized towns outside the South. These are the regions where the percentage of people without church connections was already 30-50% in 1971 and certainly still higher in 1981. Two provinces scored remarkably highly across a great deal of their territory, namely Groningen and Noord-Holland. Their irreligion, at 39 and 41% respectively in 1971, was almost twice as high as the national average (23%) and 10% higher than the most urbanised province of Zuid-Holland (29%).

Map Thirty-Four

COST OF BUILDING SITES FOR SUBSIDISED HOUSING, 1979-80

This map requires some explanation, even for Dutchmen, of the unusually complicated way in which subsidised housing is regulated in The Netherlands.

The cost of land for a residential district consists of the following parts (in global percentages):

1. acquisition costs of the land, mostly in agricultuaral use, (10%);
2. cost of preparing land for building (70-75%); in regions with a high ground water level this sometimes includes the raising of the area with sand, in addition to the usual provision of drainage, sewerage, conduits for water, gas, electricity, telephone and so on;
3. cost of facilities beyond the need of the district itself (5-10%);
4. cost of the municipal administration that arranges this 'preparation' of land for building (10%), also including the loss of interest on the stock of land which the municipality must often purchase long beforehand.

These four sorts of costs together amounted to an average of about *f* 70 to *f* 80 per m^2 in The Netherlands in 1979/80. This is however not the price per dwelling, as a residential district does not only consist of houses but also of roads, parks and so on. Such open spaces

occupy about 40% of the district, so that about 60% remains for the dwelling units themselves. This leads therefore to a price of about 10/6 times *f* 75 = *f* 125 per m² 'land for houses'.

The map only covers 'Housing Act Dwellings', that is units built under the Housing Act of 1962 with 100% subsidy by the national government. The latter inevitably imposes stringent regulations, including a price ceiling for the actual building land for such a house. This price was *f* 14,000 in 1979-80. If this amount is divided by the net cost price of about *f* 125/m² mentioned, than a house built under the Housing Act could not occupy more than 110-115 m². This is too little however, because the government has also prescribed a minimum lot size of 140 m² for such a house. From the two prescribed numbers, i.e. *f* 14,000 and 140 m², a m² price of *f* 100 results, which is considerably less than the cost price of *f* 125 calculated above.

The municipality would thus have to lose money on this building land but naturally wishes to avoid that. That is possible by allocating a part of the residential district for houses that are not subsidised at all or for much less than 100%. Consequently such houses are more expensive, not only because they are larger but also because they occupy land which is sold to the owner of these houses for a much higher price than the cost price of *f* 125 mentioned. Land for such houses cost *f* 140 to *f* 200 per m² in 1979-80.

This unloading of the cost of the land onto more expensive houses to reduce that of the dwellings built under the Housing Act is, of course, easier as there are relatively more private buyers in the housing market. This factor is in theory one of the variables accounting for the regional differences on the map. Unfortunately that does not tally with the picture about incomes supplied previously. There are in percentage terms more higher incomes in the West of the country and that would be bound to have a depressing effect on the price of land for dwellings built under the Housing Act. However this latter price is highest in the West according to the map. The explanation for this paradox lies partly in the over-large surface areas of the regions used here. Within each region are both municipalities with predominantly high incomes, which are however small in number, and municipalities with almost exclusively low incomes, which dominate the picture of the whole region by their great statistical weight in population. Certainly the purchasing power of the low incomes is somewhat higher in the West than elsewhere, because the possibility of a second income per family, through working wives, is greater. That can tempt a financially hard-pressed municipality to a lower subsidy for the price of land of the Housing Act dwelling, so that its price is higher. Thirdly the purchase price of land (factor 1 above) in the West is certainly higher for two reasons. A hectare of agricultural land costs more there and there are more high-spending buyers in the form of companies, in the market for land. Fourthly, building on clay and especially on fenland, of which nearly the whole of the West is composed, is more expensive than on sandy ground, owing to the necessity for raising the ground, placing foundations on piles, and especially with multi-storey buildings, the provision of lifts and a larger area of roads and public open spaces per district.

Map Thirty-Five

MIGRATION BALANCE, 1970-79

The difference between the two periods on both these maps lies above all in the number of symbols. On the left the number of black dots is 301 and the number of open circles is 161. On the right-hand map the numbers are just 254 and 68 respectively. It is only a question of balances here and a given regional balance can of course be the result of very divergent numbers of immigrants and emigrants. Yet the differences in the numbers of symbols indicates that the migration flows in 1970-74 were greater than in 1975-79. There are a number of reasons for this.

First the quadrupling of the price of oil in 1973, combined with the oil boycott of The Netherlands and the USA by OPEC from the end of October 1973 to the middle of 1974, reversed the trend to live ever further from the place of work and to bridge this daily distance by car. In the course of 1974 the number of longer distance house removals, which had been rising for a number of years, decreased.

From 1975 this development progressed still further. This factor was strengthened in the course of the period 1975-79 by a second, namely the deepening of the recession, with a considerably decreasing effect upon the number of house removals because of change of work. In the third place, in 1975-79 the influence becomes noticeable of a change of government policy in respect of population dispersal, which has automatic repercussions on the construction of new houses, since the government subsidy on house-building forms its only powerful weapon in influencing the dispersal of the population. This policy change was laid down most clearly in the Urbanisation Paper (Verstedelijkingsnota) of 1976, which heralded a radical reversal in the government's endeavours to steer the migration out of the large cities in spatially optimal directions. This migratory loss resulted in the impoverishment of these cities in a figurative but also literal sense. Figuratively that process is recognisable in all cities in the world. Those with high incomes and young families abandon the city in disproportionate numbers, leaving behind the old and the poor. The literal impoverishment is more specific, because it is dependent on the financing of the city. In The Netherlands this is primarily proportional to the number of inhabitants per municipality. In 1970-74 alone that number dropped per 1,000 inhabitants in the four largest cities, where for lack of a surplus of births this loss of population was caused almost entirely by migration, as follows: Amsterdam −18, Rotterdam −20, The Hague −26, Utrecht −17.

The corresponding absolute loss is to be found on the left-hand map, be it only in part since instead of municipalities, nodal regions are used on the map, concealing a municipal loss of residents to contiguous municipalities in the mapped balance. This elimination even leads to no single symbol in the region of Utrecht on the left-hand map, although the municipality of Utrecht lost 23,000 of its 280,000 population (per 1.I.70) in 1970-74. Therefore the left-hand map is dominated by the losses of the three largest cities.

Emigrants from Amsterdam are nearly all to be found in a northern and easterly direction, where relatively enormous new residential areas have been added to a limited number of smaller places by large-scale subsidies from the government. These are the so-called 'growth nuclei', officially designated as such by the government. This status was also granted to the entirely new town of Lelystad in the Flevopolder, where the first inhabitants only arrived in 1967 and the population was barely 1,000 in 1970. There were 5,000 residents in Lelystad in 1975 and 10,000 in 1980, the majority of whom came from Amsterdam. The 15 dots in Flevoland also refer however to the southeastern adjoining 'old land' that belongs to the same nodal region.

The thrust out of The Hague is to be found mainly in an easterly direction. This played havoc with the Green Heart despite all the lip-service paid since 1960 to the policy of keeping this inner area of the Randstad open. Because no other point of the compass was available for the overflow from The Hague, the movement out of nearby Rotterdam was directed southwards as much as possible. This also soon led to settlement in Brabant on the other side of an estuary over which only two bridges have existed since 1972, which have become great points of congestion because of commuter traffic.

On the right-hand map the three large blocks of negative migration balances mentioned above appear significantly reduced in size, as a consequence of the three factors enumerated earlier. Quite spectacular are the suddenly apparent possibilities for finding substantial space for houses within the large cities. This was again achieved by enormous financial help from the government, first of all for renovation of existing houses, and secondly for the demolition of old dwellings and their replacement by new ones. Against the very high cost of this policy formulated since 1976, two advantages can be set, namely the slowing down and ultimately turning round of the decline of the large cities, and the reduction of commuting over great distances by car with all the concomitant energy losses and rising costs of traffic facilities.

The settlement surplus clearly increased in only two regions on the right-hand map. This occurred around the city of Utrecht because of the building of the new growth nuclei, and in Flevoland where, except for Lelystad, the new town of Almere mushroomed in 1975-79. This is much closer to Amsterdam (15 km) and with respect to Lelystad forms a textbook example of an 'intervening opportunity'. Flevoland had an annual settlement surplus of only 2,000 people in 1970-74, but it rose to 8,000 in 1978 alone, and would be even more than 10,000 in 1981 and 1982.

Map Thirty-Six

POLLUTED WATER AND WATER PURIFYING CAPACITY, 1980-85

In the text for Map Fourteen the Pollution of Surface Water Act of 1970 was discussed. Article 33 of this law obliges the government to draw up an 'indicative long-term programme' every five years in which all plans to be carried out in the coming five years for combating water pollution are stated. The first of these programmes appeared in 1975. The information mapped here originated from the second programme that was published in 1981.

The 39 'control regions' have been merged into 21 because of the size of the map. Such merging occurred particularly in the provinces of Zuid-Holland and Zeeland, where these regions are relatively numerous and thus frequently small, as was seen on Map Fourteen and was also explained there.

The purification capacity was trebled throughout The Netherlands in the seventies under the coercion of the new law. Nevertheless, as is seen from the map, the capacity available on 1.I.1980 was greater in only six of the 21 regions than the pollution released there. In three of these six it was even 20 to 30% greater, which led to considerable financial problems for the purifying organisations. These problems were to occur on a much larger scale on 1.I.1985, because then the expensive purification plants would have more capacity than needed in twelve of the 21 regions. This 'mis-investment' is caused by the changing size of industrial pollution during the long period of many years which elapses between decision to build a purification plant and its completion. The amount of dirty household water can be accurately estimated but not that of industry. Not only can new factories be established in the region but existing companies can a) be closed, b) be reduced in size, c) start producing a less contaminating product, or d) install their own water purification plant if that is cheaper. The public plant then loses large customers. This uncertainty, with all its financial risks for the purifying organisation, is greater as a region has to cope with a smaller total amount of dirty water and a larger industrial share of this total. The latter share varied between 30 and 60% in 1980, with the only exception being the extreme case of Groningen at 90%. The clearly enormous industrial pollution there, 25% of the national total for industry, is almost exclusively caused by one activity, namely ten factories (in 1980) which produce starch from potatoes for only three months of the year. This waste was all released into the estuary that forms the boundary between The Netherlands and Germany until 1970. This drainage was free until 1971 but was taxed after that in accordance with the new law. The Germans moreover increasingly objected because this enormous stream of waste would threaten the bathing beaches of the German Wadden Islands. Between 1980 and 1985 the number of starch factories was diminished from ten to five, each of which was to be equipped with its own purification plant. This conversion was not yet completed in 1985 but the dark-coloured bar on the map at 3.5 million inhabitant-equivalents will have been shortened so much that the releases are no longer six times as great as the purification capacity but 'barely' three to four times.

In 1985 this capacity in all other regions was expected to be either greater than the expected pollution (in twelve of the regions) or show a shortfall of five to a maximum of 40% at the most. The expectation is that in 1990 all the polluted water will be completely purified before it is released into the (by then) clean surface water. This otherwise fine prospect only applies to impurities that can be broken up organically. Other solutions must be found for substances such as heavy metals.

Map Thirty-Seven

EMPLOYEES IN MINING, MANUFACTURING AND PUBLIC UTILITIES, 1980

There are 127 Labour Exchange Districts depicted here with an average surface area of 270 km^2, so that a detailed dispersal picture can be seen. That applies with greater force for manufacturing which comprises 95% of the quantity depicted (see footnote to map).

If these regions are ranked according to the number of employees, the two largest each comprise 5% of the national total, namely Rotterdam and, because of Philips, Eindhoven. The district of Amsterdam follows with 4.6% and after that the numbers fall at once to about 2.5% and lower.

Cumulatively only five regions are needed to reach 20% of the national total, with ten regions needed for 30%, 16 for 40%, 23 for 50%, 32 for 60% and 40 for 70%. The remaining 87 districts, therefore, contain together the 30% left over and not one of them reaches 1%. It is thus the spatially characteristic picture of concentration of industry.

If contiguous regions, each with at least 1%, are added to larger industrial regions, which each comprise at least 10% of the national total, then there are three such regions. The largest at 17% is the triangle Leiden-Vlaardingen-Gorinchem. The more flat triangle in Brabant between Breda, Den Bosch and Helmond follows at 16%. Third is the conglomerate of the districts of Amsterdam, Zaanstreek, Alkmaar, IJmuiden, Haarlem and Hoofddorp, together registering 12%. These three regions together thus contain 45% of the Dutch total.

It is true that the regions situated in between those three do not comply with the boundary criterion of at least 1%. However they are so small that the existence of one large manufacturing region may be presumed in the pentagon drawn between Alkmaar, Twente, Maastricht, Bergen op Zoom and Hoek van Holland. Within these confines 85% of all employment depicted here is to be found.

This national total is still falling. The statistical registration used here has existed since 1973, when the national total was 1,239,000. That diminished by 11% in the following seven years until it reached the size stated in the heading. However in just four years between 1980 and 1984 a further reduction of more than 10% occurred, accompanied by a rise in unemployment from 6 to 17%.

Map Thirty-Eight

MARRIAGE AND DIVORCE, 1976-80

Map Nine showed the rise in the number of divorces per 1,000 marriages by province for five periods of five years each until 1975. This map concerns the subsequent period but presents the quotient of the number of marriages and divorces per 1,000 inhabitants for 129 regions.

In these five years an average of 12.8 marriages took place per 1,000 inhabitants in the whole of The Netherlands, while 3.2 divorces were finalised. Thus a quotient of 4.0 resulted as stated on the map. How rapidly these two socially important processes changed in The Netherlands during the seventies appears from the high level of both variables in the immediately preceding period 1971-75: 16.4 marriages and only 2.4 divorces, so that the quotient then was almost seven. These national figures illustrate that the quotient can be higher or lower, in time and in space, owing to either another numerator or denominator. As the number of marriages is more closely linked to specific age groups than the number of divorces, both variables could be seen as independent of each other within a five-year period. They are however both exponents of the social revolution, which was featured on earlier maps and which, at a tempo never previously exhibited, could be spread owing to an almost daily drum fire against specific norms and values from the guns of television. This influence had continued five years longer in 1976-80 than in 1971-75 and led to a much greater social acceptance of divorce and to the postponement or even suspension of marriage. Interpreting the reduction in the frequency of marriage mentioned above, it must be remembered moreover that there were about 175,000 more people in the age-group 20-30 years in the period 1976-80 than in 1971-75, so that a higher frequency of marriage per 1,000 inhabitants could have been expected, while in fact this was considerably lower (12.8 as against 16.4).

There were relatively high frequencies of marriage during 1976-80 in two sorts of region, both having a high percentage of population in the age group 20-30 years. The first sort consisted of cities with universities and other forms of tertiary education, where numerous young people had settled usually for five to ten years. The second sort consisted of regions which had known abnormally high birth rates 20-30 years earlier because of a high

proportion of Roman Catholics or Calvinists amongst the population, but from where few young people had migrated. The first sort also had however a high number of divorces, as befitting cities with consequently a lowered quotient. The second sort had a religious brake on divorces and therefore exhibit the highest quotients on the map.

Relatively high numbers of divorces occurred in regions characterised by low levels of church membership and a high degree of mental urbanisation. Within such areas a few subgroups can be discerned, namely, 1) the large cities; 2) older commuter regions with many high incomes, such as Gooi, Kennemerland, Amstelveen, areas around The Hague and to the south of Rotterdam; 3) regions with a substantial recent settlement surplus of mainly young families such as Delfzijl, the Flevo polders, Nieuwegein, Voorne-Putten and areas to the north of Amsterdam; 4) Roman Catholic regions where the ecclesiastical discipline was weakened first, as around the Brabant towns and in mid and south Limburg.

Of the above-mentioned subgroups, two and three are black on the map because on the one side the frequency of divorce is only a little higher than the national average, whereas on the other side few marriages take place, in the case of subgroup two because of a shortage of young people and in that of three because young married couples settled there. In the subgroups one and four there are more marriages than the national average but far more divorces take place, so that their quotient condemns these regions to be 'black'.

This bipartition is not necessary in the lightly shaded regions. They are all characterised by low frequency rates for divorce because of religious inhibitions and/or a large share of farmers who cannot permit themselves to divorce because of the family business.

Map Thirty-Nine

ELECTION RESULTS FOR THE LABOUR AND LIBERAL PARTIES, 1982

Elections for the provincial parliaments ('Provinciale Staten') are principally determined by the political balance at national level. This is an inevitable consequence of the constitutionally decreed character of The Netherlands as a unitary state. In this context the provinces are only competent to act in domains where little or no ideological credit can be gained so that parties have difficulty in profiling themselves at provincial elections.

Many parties exist in The Netherlands through the system of proportional representation. No less than 17 participated in the election mapped here. They can be divided into three groups, namely all the parties of the left (8), all the 'Christian' parties (5), and the remaining parties (4). In each of the three groups there is one large party, as follows: the Partij van de Arbeid (PvdA, comparable with the Labour Party), the Christelijk Democratisch Appel (CDA, a 'centre' party with a Christian character), and the Volkspartij voor Vrijheid en Democratie (VVD, a party with a liberal programme, but also attracting conservative votes). Their dominance within each of the three groups is obvious from table 39.1.

Within the left block important shifts often appear at elections. In 1982 the PvdA polled poorly because relatively large numbers of votes went to the seven small left-wing parties. Four years earlier all the parties of the left together polled 43.4%, of which the PvdA alone won a good 33%. In 1982 for the first time in the post-war history of The Netherlands this party polled below the VVD, which made a leap forward from 17% in 1978 to 22% in 1982.

This substantial shift, by Dutch standards, in the following of the two large non-confessional parties, PvdA and VVD, was the motive for this map. Five blocks were chosen for the key. *Below left* both parties score less than their national average, while a threshold of 11% has been chosen because the VVD did not reach higher in one polling district, while the lowest value for the PvdA is 12% in two districts. Twenty-seven of the 73 districts fall

Table 39.1. *Voting percentages 1982.*

	Percent
Left group	38.8
– of which PvdA	20.7
Christian group	38.5
– of which CDA	33.3
The rest	22.6
– of which VVD	22.2

within this block in the key, of which 22 are situated in the predominantly Christian-voting provinces of Overijssel, Gelderland, Noord-Brabant and Limburg, whose totals would also fall within this block.

A second block in the key *above right* provides the map shading where both parties obtain at least their national average, rising to a maximum of 34% for the VVD and 31% for the PvdA. Twelve districts belong to this category. The whole of the provinces of Noord- and Zuid-Holland also belong there as the PvdA and the VVD together polled precisely 50% of all votes in both provinces, with hardly any difference between them in their share of the vote.

The PvdA however scores values of 33 to 41% in six districts, sufficiently high to require *a separate key block* and also large enough in number of voters for a separate representation. Rotterdam traditionally belongs to these six 'reddest' districts. The other five are to be found in the three northern provinces, where the peat colonies ('veenkoloniën') especially and southeast Friesland have voted left since the nineteenth century. The provincial capital of Friesland also falls into this block. More remarkably this does not apply to the city of Groningen, which electorally is a scaled-down version of Amsterdam. They stand together at the top of the list of the left-wing following with 60 and 63% respectively. However, a great deal of this following, in 1982 almost half, was polled by the small parties of the left, so that in both cities only 31% of all left votes accrued to the PvdA.

The *two remaining blocks in the key* are mirror images of each other. In one the PvdA exceeds its national average but the VVD scores below (15 districts). In the other block this is reversed (13 prosperous districts, of which two are in west Brabant and all the others in the triangle Texel-The Hague-Apeldoorn). Areas with high PvdA and low VVD scores are much more dispersed: from large parts in the North to smaller ones in Zuid-Limburg, and in between Enschede and Deventer, to the north of the Waal, and Amsterdam and Zaanstreek, all areas with low incomes.

Map Forty

PROVINCIAL SHARE IN NATIONAL AGRICULTURAL PERFORMANCE, 1970 AND 1980

This is a particularly interesting map from a geographical point of view because it concerns an economic activity which occupies 70% of the area of The Netherlands. In the seventies Dutch agriculture as a whole developed in two directions, which had already been initiated in the sixties, influenced by the European Economic Community (EEC) since its inception in 1958. One direction was that of animal products, traditionally dairy products, subsequently supplemented by veal, pork and chicken meat production. The other consisted of a more varied package of horticultural products.

The influence of the EEC had, broadly speaking, a 'natural' and an artificial component in the seventies. The first was a further enlargement of the Common Market through the entry of the United Kingdom, Ireland and Denmark. The second was the pricing policy of 'Brussels', by which specific forms of farm products were stimulated, so that these took the place of less remunerative products in a country where the surface area of cultivable land was slowly declining.

The national circumstances of production naturally also changed within this supranational framework, among other reasons because the national government pursues its own agricultural policy. In this way greenhouse horticulture was promoted by placing low-priced natural gas at the disposal of market-gardeners, against which other member states protested in Brussels after a few years. Furthermore the Dutch government has continued its re-allotment policy. In 1960 6% of all cultivable land was re-arranged in this way, in 1970 17%, but in 1980 nearly 40%. The parcelling out, drainage and accessibility are optimised against costs of which barely 30% is borne by the farmers, in a micro-regional operation lasting 10-15 years. As part of these improvements subsidies were given for the building of cattle sheds with free mobility for the animals, particularly in the seventies. There were just 800 of these new sheds in the whole country in 1970 but 17,000 in 1980, at which time there were 60,000 dairy cattle con-

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cerns. Regulations to combat manure overproduction, which has been shown earlier on Maps Two and Thirty-One, were consciously avoided by the government, although the manure surplus led to pollution of the ground and surface water and promoted acid rain through ammonia emission into the atmosphere. A start was only made in the eighties with measures to limit these disadvantages, but in the seventies a brake was not put on the bio-industrial agriculture in its tempestuous development.

On the map the three generalising economic quantities summing up agricultural production are depicted for 1970 and 1980. This choice of six variables prevents the use of a more detailed spatial differentiation than by province. Each province's share in the national gross output, input, and added value is shown separately for 1970 and 1980. The symbols used represent the provincial shares in rounded-off percentages, but for greater precision the per thousands are also added, be it in figures.

The best yardstick for the contribution to national prosperity is added value. Before this is elucidated here by province it must be said that this variable in The Netherlands as a whole is excessively high even in comparison with the other EEC states (Table 40.1)

How is this high added value spatially distributed within The Netherlands, and how far has this pattern changed between 1970 and 1980? The map shows that the share in the national added value between these two years has dropped in no less than seven of the eleven provinces. In Zeeland that share is unchanged, so that the contribution has increased in just three provinces, certainly in greater measure than the decline elsewhere. It is even noteworthy for Dutch readers to ascertain that the most urbanised province (Zuid-Holland) with a population density of 1,100 per km² and barely 8% of the Dutch cultivable land, yielded 17% of the agricultural national added value in 1970, and had even managed to extend that share to 21% in 1980. This is self-evident because Dutch horticulture, which holds pride of place in the world, is, for the most part, located in Zuid-Holland and its greenhouse production is almost totally there.

Table 40.1. *Net added value at factor cost (in ECUs) per agricultural worker and per hectare of cultivated land, 1983.*

	Per Worker	Per Hectare
Netherlands	20,770	2,542
Belgium	17,140	1,265
Luxemburg	10,800	633
France	9,310	519
Italy	7,610	1,103
F.R. Germany	5,430	623
Un. Kingdom	10,710	362
Ireland	9,610	282
Denmark	9,100	655
Greece	5,000	587

The shares of Noord-Brabant and Limburg also increased from 1970 to 1980, reflecting their large role in bio-industrial agriculture (as previously illustrated on Map Two). Yet their combined contribution to the national added value was only slightly more than that of Zuid-Holland alone. Also their joint share in the nation's cultivated land (20%) barely differs from that of their added value (19% in 1970, 22% in 1980). This rough equality also applies to the other two provinces with considerable bio-industry, Overijssel and Gelderland: 12 + 13% of the cultivated land, producing 11 + 14% of the added value in 1970, and 10 + 12% in 1980. This moderate achievement in added value can be traced back to the great inputs necessary for this kind of agricultural production.

The added value is naturally dependent on the difference between output and input. From a national economic viewpoint the input is of special significance. In so far as this is generated domestically by suppliers to farmers and market-gardeners, this creates income somewhere in The Netherlands. That advantage is absent in the case of imports and these have become greater, particularly as more animals have been kept per hectare, so that additional purchases of cattle feed have become necessary. It is then also no coincidence that only the four provinces with the most bio-industry show higher shares in the national input than their shares both in the added value and in the output. This 'disproportion' is even clearer in 1980 than in 1970 and is the most out of balance in Gelderland and Brabant, somewhat less in Overijssel and very small in Limburg. The latter is caused by this province also accommodating a considerable horticultural production, which is characterised by a very favourable ratio between input and added value. This is best seen in Zuid-Holland where in 1980 the 21% of the national added value, already mentioned, was produced with only 13% of the national input. This ratio is still

better in Zeeland which despite its small size scores 5% and 2% respectively. Noord-Holland (10% and 6%), Groningen (5% and 3%) and Drenthe (5% and 4%) are also positive.

The last two provinces mentioned form with Friesland the North of the country, where in 1970 only 20% of the national added value was produced on 27% of Dutch cultivated land, and only 17% in 1980. The input-share was however still lower: 13 in 1970 and 14 in 1980. This reflects a much more extensive use of land than elsewhere in The Netherlands, which is explained by a) the smaller scarcity of space owing to the lowest density of population and b) a peripheral situation, resulting in no horticulture being developed. Small wonder that the average size of farm in the North is large in Dutch terms, which in its turn was not an inducement to bio-industrial agriculture. Moreover the cultivable land in Groningen is two-thirds arable land and in Drenthe this is one-half. Friesland, the province renowned for dairy cattle, deviates from this pattern by consisting almost completely of grassland. Its output-share rose between 1970 and 1980 because of the dairy policy of the EEC, but its input-share grew much more steeply through the large increase in the purchase of enriched fodder, so that Friesland's share in the added value fell considerably and was not greater, in 1980, than that of Limburg with barely half as much cultivable land as Friesland. Also in comparison with the investments by various government organisations in re-allotment schemes and the like in Friesland in the seventies, its share in the added value contrasts poorly.

Map Forty-One

DISTRIBUTION OF PHILIPS PLANTS AND EMPLOYEES, 1982

As can be seen from the footnote to this map Philips belongs to the global giants given its turnover and particularly its number of employees. As opposed to Royal Dutch Shell and Unilever, the decision-making at Philips is completely based in The Netherlands. Consequently the significance of this concern for the little homeland is so out of all proportion that the explanation with this map must be a little more generous.

Philips was founded in 1891 with the sole purpose of producing light bulbs. This happened just twelve years after the development of the first usable light bulb in 1879 by Thomas Edison. Nevertheless the production of this new article in Europe was already seized by Siemens and Halske in 1881 and by AEG in 1887. The latter company hired the engineer G. Philips in 1890. However in 1891 he and his father decided to set up business for themselves. The family lived in the small town of Zaltbommel in Gelderland but the two founders understood that no skilled workers could be recruited there. They felt this was possible in Brabant, then already considerably industrialised. The regional 'situation' for this factory was therefore consciously chosen, the local 'site' was however coincidental. This is also apparent from the fact that father and son Philips had bought a plot in Breda two months before the official establishment of the business but abandoned this when they were able to buy a disused factory in Eindhoven for almost nothing.

The very survival of the factory hung by a thread almost immediately. In 1894 it was decided to sell the business. However the buyer did not offer more than *f* 24,000 whilst the two owners considered *f* 25,000 to be a minimum. Because of this difference of *f* 1,000 the premature baby survived to develop three-quarters of a century later into the largest non-American employer in the world and the only multinational outside Japan left in the field of consumer electronics. This unparalleled success must be mainly attributed to the 16-year younger brother of the engineer G. Philips, Anton, who was found willing to be hired for half a year as a selling agent. Through the achievement of this commercial genius, Philips' employees numbered 1,000 in 1908 and 2,500 in 1911.

The First World War cut the neutral Netherlands off from foreign export markets as well as from foreign suppliers. This led to the establishment of their own glass factory in Eindhoven in 1916. This first step towards vertical integration on site was advanced after 1918 by the building of their own factories for corrugated cardboard, hydrogen gas, paper, artificial *philite* and so on.

From the twenties onwards they set up their

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own sales organisations in more and more countries, assisted by the explosive growth of radio as a second base alongside the lamps. Factories of their own were established abroad mainly during the depression in the thirties when import limitations were encountered everywhere. At the same time the number of staff at Eindhoven had to be halved. This spatial shift is evident from table 41.1., comparing the workers in October 1929 (when the collapse of the New York Stock Exchange ushered in the depression) and ten years later on the eve of the Second World War.

Table 41.1. *Number of Philips employees.*

	October 1929	June 1939
In The Netherlands	27,000	19,000
In other countries	13,000	26,000
Total	40,000	45,000

The spread of Philips outwards from Eindhoven across The Netherlands is depicted on the map. A short explanation of the pattern makes the distinction of two categories necessary. The first consists of already existing companies, which were taken over by Philips and whose location therefore was not determined by Philips. The second consists of the remaining subsidiaries established by Philips itself.

Belonging to the first category are the only three companies which were bought up (long) before 1940: Vitrite in Middelburg, which made the cases for light bulbs; and two, at that time, smaller lamp makers, namely Volt at Tilburg and Pope at Venlo, both bought in 1920. All the other companies taken over were only acquired by Philips after 1945. Several large companies are mentioned here because they stand out on the map. The radio factory of R. S. Stokvis in The Hague is still in business today under the trade name Erres. The *Nederlandse Seintoestellen Fabriek* in Hilversum, set up in 1918, is the cradle of the Dutch radio world because the first radio broadcasts began here in 1923. This factory is in fact the origin of the development of Hilversum as the radio and later television centre of The Netherlands. This plant is now called *Philips Telecommunicatie Industrie* and forms the core of this division of Philips. A special case is The *Hollandse Signaal Apparatenfabriek* (HSA) at Hengelo which was established there in 1922 by the manufacturer Hazemeijer together with the German Siemens, who began to produce gunnery control apparatus and similar 'military hardware' in The Netherlands, when the Treaty of Versailles forbade this in Germany. Because of this ownership the company was classified as 'spoils of war' in 1945 and was confiscated, after which it was purchased by Philips in 1948. Several other companies taken over were not stated on Philips' 1982 list of subsidiaries, which is the basis for this map, and are, therefore, also not shown, such as the record factory *Phonogram* at Baarn.

The second category contains the subsidiaries with a location selected by Philips itself. This choice was incidentally restricted for companies which were set up immediately after the liberation of The Netherlands in the years 1946-48. In comparison with the swiftly rising demand then, there were insufficient possibilities for new building construction in the plundered Netherlands and there was a shortage of space in Eindhoven. Consequently twelve factories were established elsewhere in these years, of which most were initially in already existing buildings of all kinds. In this way production even landed in places, which in view of the then still defective means of transport were strictly speaking too far from Eindhoven, such as Doetinchem and even Zwolle.

These bottle-necks ceased to exist after 1950 and a second wave of expansion began, now mainly in the regions with an ample labour market, either for men and women or only women. The latter applied to regions where specific 'male' activities dominated, such as in the coalmining region of Zuid-Limburg and in some towns in Brabant. Ample labour supply in general led to the first Philips establishment in the Northern Netherlands in 1950. This was at Drachten, which was so far from Eindhoven that the manufacture of a new product was placed here, as it was minimally dependent on semi-manufactured articles supplied from elsewhere. When the national government's regional industrialisation policy began in 1952-53, Philips took advantage of this by establishing more subsidiaries in such regions. These were sited in the North at Stadskanaal (1955), Hoogeveen (1956), Groningen (1960) and finally Winschoten (1973), and also in Zeeland (Terneuzen) and northern Noord-Holland (Hoorn). Apeldoorn is an isolated, yet interesting case. It was chosen by the government in the sixties as the site to which parts of The Hague's government apparatus were to be transferred. That included the Tax

Office Computing Centre (*Rekencentrum der Belastingdienst*) and the State Mechanical Administration (*Rijksmechanische Administratie*), which induced Philips to set up its new production line for computers there. However Apeldoorn was quickly abandoned by the government and Philips also had little success with this new product.

In Eindhoven itself employment increased initially very quickly from 26,000 in 1950 to 37,000 in 1960. That could in no way be supplied by its own population. A large stream of incoming commuters came into existence, amongst whom were before long thousands from nearby Belgium, transported daily in buses. The financial and social disadvantages of this drift were diminished by the establishment of subsidiaries in the surrounding areas (Best, Deurne, Geldrop, Maarheze, Nuenen, Valkenswaard, Veldhoven, Waalre, all between 1949 and 1971). In Belgium, this was facilitated by the Benelux treaty and stimulated from 1959 onwards by Belgian regional policy.

Dutch labour became so expensive from the middle of the sixties that Philips, through the EEC, opened more and more factories in other member states, but also elsewhere in the world. In this way the number of employees in The Netherlands reached its maximum of 98,000 in 1970 (spread over almost 60 locations). This number declined after that, initially slowly (95,000 in 1974), thereafter more quickly under the impact of specific Dutch circumstances (an anti-industrialisation government in 1973-77, rising social costs and absenteeism due to sickness and so on) to the level of 84,000 in 1978 and (as is evident from the map) 73,000 in 1982. This decline of 25% in twelve years resulted in remarkably few closures of subsidiaries. A few plants were sold by Philips because it wished to shed the products concerned. However apart from that the subsidiaries were kept open, although with a reduction in the number of personnel and preferably without compulsory redundancies. In many cases that was attained by starting the manufacture of a new product on site or by transferring the production of article X from location A to B. In general the life of a Philips factory is extended longer (including losses over many years) than other entrepreneurs are able or ready to do. This is in keeping with the progressive social policy that has always characterised the firm and with the realisation that many subsidiaries are the only large employer in their place of establishment, 'one-company towns', which would experience massive unemployment on Philips' departure.

Map Forty-Two

REGIONAL SHARE OF WAGES, TOTAL AND GOVERNMENT-DERIVED, 1980

The composition of regional input-output tables is so time-consuming that they are available only every five years and then with great delays. Therefore it was decided shortly after 1970 to publish separately a limited number of statistics from these tables, which could be quickly ascertained, and these are mapped here for each of the 40 regions. These statistics concern the gross value of the goods and services (output) produced, the input needed for that, and the resulting added value specified in its four components: wages, social charges, indirect taxation and residual incomes. These four components form respectively 45, 14, 10 and 31% of the added value for the whole of The Netherlands. This division differs little by region. Only where agriculture is a relatively large sector of production is the share of the 'residual incomes' higher and that of wages (and the social charges dependent on them) lower than the national average. For practically no wage employment is to be found anymore in Dutch agriculture (except in horticulture) and the reward for the factors of production 'land' and 'independent entrepreneur' (both belonging to 'residual incomes') is obivously high. The only region with a wholly divergent division across the four components is that part of the province of Groningen under which the enormous gas field is situated. The component 'residual incomes') is obviously high. The only region with whole province still 66%, about twice as high as in all other provinces.

Of these four components, wages are shown on the map in the form of the share of each region in the total national wages component, expressed in quantitative symbols per hundred and per thousand. These symbols are placed in the regions in which these wages are earned,

without reference to whether the earners themselves live in or outside the region. This causes a domination of the large employment regions on the map, which is reinforced by the great extent of the areas around Amsterdam and Rotterdam especially, each accounting for more than 10% of the sum of the national wage. In contrast the area of The Hague is very small and yields therefore only 6.4% of all wages, less than Utrecht (7.0%), but yet as much as the whole province of Overijssel or Limburg.

After these two areas of 10% each and the two regions each with 6 to 7% (which together account for 34% of the national wage), there is a considerable gap towards the next two regions, each of which has 4.5% (Eindhoven and Arnhem-Nijmegen). All the rest of the 34 regions are at most up to about 3% and ten do not even manage 1%. The wages total is thinnest spread over a maximum territorial extent in the whole area to the east of the River IJssel (the four northeastern provinces plus Gelderland's Achterhoek). Although covering 40% of the Dutch surface area, total wages are even less than in the single province of Noord-Holland, occupying 8% of the Dutch territory.

The map furnishes a second set of statistics depicted by choropleths, namely the share that the government's wages form of all wages in a region. Under the heading 'government' are included all normal activities of public administration at all three levels (including administration of justice, education, social security and so on), except concerns formally owned by government but producing goods or services sold at a price, which at least 'approximately covers the costs'. This government share in total wages averaged 21% nationally (see key) but differs considerably by region. A minimum of 12 to 14% is only attained where the government is present only in the form of municipalities and smaller water boards (five of the 40 regions). Areas also containing provincial government bodies and perhaps a single state service with a modest number of staff form the 23 regions of the categories of 16 up to and including 22%. The eight areas, where the government wages reach up to about 25%, have either temporarily large numbers of government employees in a thinly populated area (Flevoland polders, Delta area) or higher educational institutions with many personnel (Leiden), possibly in combination with the usual state organisations in provincial capitals (Groningen, Leeuwarden, Zwolle, Arnhem-Nijmegen and Utrecht). In the highest category only the seat of central government (The Hague) is to be found and three thinly populated areas with large defence functions (N. Drenthe, Veluwe, Den Helder).

Map Forty-Three

DENSITY OF DWELLING UNITS, 1984

Whoever believes that housing density is more or less directly proportional to population density, would be apt to regard this map as a seven-year update of Map Seven. However this direct proportion is incorrect, certainly if observed over a longer period, for example since 1947. The first Census after the Second World War, which also gave detailed information about the current housing stock, was held in that year. Thereafter such information continued to appear in detail, among other reasons, because the housing shortage remained a political problem and the construction of houses became more and more a matter for the government (see information with Maps 6 and 34). The principal changes, which have undermined a direct proportional relationship between people and houses per km² since 1947, are:

1. a decline in the average number of inhabitants per dwelling by about one-third (4.33 in 1947 and only 2.77 in 1983);
2. an increase in the size of dwellings: houses with one or two rooms have virtually disappeared, whilst on the other hand houses with five or more rooms have risen from 60% of all houses in 1947 to 80% in 1983;
3. the number of houses per km² of built-up area declined, mainly through the addition of more public open space and space for traffic.

On the map a not unexpected logarithmic scale is necessary for the key. Many foreigners may well be surprised that a threshold value of 15 dwellings per km² can be chosen for such small areas as are depicted here (averaged just 33,936:129 = 263 km² large). In fact this is about 30/km², because only the Wadden Islands (Waddeneilanden) at 18/km² compel

the threshold to be registered at 15.

Equally striking to those well informed about metropolitan densities elsewhere in the world is the modest maximum in the key, namely 3,000. It is also possible here to suffice with a less extreme value of barely 2,000 since only one area is above that at 2,900. Remarkably enough this is The Hague, whose built-up area appears much less metropolitan than that of Amsterdam or Rotterdam, owing to its having a smaller number of high-rise flats and a larger surface area of public open space. However the built-up area of The Hague extends nearly everywhere up to the boundary of the municipality, whilst in other large cities the housing and population density are reduced by considerable areas of land not built on within the boundaries of the municipality.

As is unavoidable in this kind of map, the visual image is considerably influenced by the delimitation of the regions. In this case each municipality with at least 100,000 inhabitants forms a separate region and this naturally has a heightening effect on the densities shown here. Only nine of the 129 regions are to be found in the highest category of the key. The land area of these nine is less than 2% of the total area of The Netherlands, but they contain more than 20% of all Dutch houses.

A third peculiar fact is the 'gap' between almost 1,300/km² and about 900/km², wide enough to express in the key.

The housing density increased strikingly in at least 14 regions shortly before 1984 through the building of thousands of extra houses as a consequence of the so-called growth nuclei policy. This implies the government's designation of a limited number of places where houses are to be built with the help of extra subsidies for the overflow from the large cities. A distinction is made between 'growth nuclei' (15 in number) and growth cities (4). The former are situated near the large cities and consequently in the West of The Netherlands; the latter more distant, being in the North (Groningen), East (Zwolle) and South (Breda and Helmond). The policy aims at constructing at least 6,000 houses in each of these nuclei and 10,000 in each of the cities, in both cases within a decade. This feverish building boom began nearly everywhere in 1972 but not everywhere at the same pace. The consequence was that on 1.1.1984 (the date of our map) 15-25% of the housing stock in each of the four 'growth city' regions had been built in the last twelve years because of this policy. In the regions with 'growth nuclei' this share varied: 15-25% to the north of Amsterdam (Purmerend, Hoorn, Alkmaar); 25-35% to the east and west of Rotterdam (Capelle, Spijkenisse, Hellevoetsluis); more than 50% to the south of Utrecht (Nieuwegein); and more than 75% in the Flevo polders (Lelystad and Almere), where nevertheless the density is still low on the map.

Finally it should not go unrecorded that the number of houses in a municipality determines the size of the sum of money that is paid annually from the treasury to each municipality. (This is needed because these local authorities in the Netherlands may levy hardly any taxes.) This payment was mainly based on the number of inhabitants and surface area of the municipality until 1980. The number of houses was added as a variable in 1980 after it was demonstrated that municipal expenditure is certainly as closely connected with the quantity and density of houses as with the two variables just mentioned. In 1984 this financing system was taken one step further by making the treasury's allocation principally dependent on the three-dimensional volume of the housing stock. In order to ascertain exactly that volume, it was necessary also to know the height of the houses. Therefore the law concerned dictates that the built-up area of each municipality be photographed once every three years in stereoscopic aerial pictures.

Map Forty-Four

PROPORTION OF INLAND WATER SURFACE, 1983

The expression 'Netherlands, land of water' is common in The Netherlands. Even abroad its image is that of a country abounding with water. The purpose of this map was to test whether this picture can also be expressed cartographically. Data have been derived from the Land Use Statistics (*Bodemstatistiek*) in which 35 types of spatial use are distinguished. The municipalities have to mark all these 35 forms on topographical maps with a scale of 1 : 10,000. A summary from this abundance of material is subsequently published by the Cen-

tral Bureau for Statistics (*Centraal Bureau voor de Statistiek*). This occurred for the first time in 1980, whilst this map represents the situation on 1.1.1983.

Of the 35 different types four are related to the 'outer water' defined in the footnote to the map. The 'inland water' consists of the categories 'water reservoirs' (*spaarbekkens*) (only 1,400 ha) and 'other water wider than 6 metres' (149,000 ha in the whole of The Netherlands). There also exists a class 'natural wet lands' (71,000 ha), but that is predominantly overgrown and is mainly dry in summer, so that it does not correspond to the image of open water and therefore is not included here.

A serious omission in the Land Use Statistics are all waterways less than six metres wide. They only appear as a line on the 1 : 10,000 maps, so that the municipalities are unable to draw the surface area of the these waterways. Nevertheless, because of this practical inability, one of the most characteristic features of the Dutch landscape is absent from the Land Use Statistics, namely the numerous ditches. These are primarily needed for drainage of all the cultivated land and they appear more frequently as the groundwater level lies closer to the surface: in the clay and especially low-lying peat areas, seldom more than a few decimetres. Many of the smaller ditches have been replaced by underground drainage pipes in the last decades. Nevertheless there were some 244,000 km of water passages in The Netherlands in 1983 that were kept clear by water boards and other organisations in order that their drainage function could be properly maintained. If this enormous length is divided by the land area of the whole country and of all the cultivated land, there exists 7.2 and 10.2 km respectively of water passages per km^2. Calculated at an average width of three metres, these water passages occupy 1.5 to 2% of the total area of cultivated land in The Netherlands. All that water is not included in the Land Use Statistics, nor are all water surfaces smaller than two ha (see heading of the map). Omitted as well is the water that forms part of parks, public gardens and recreation grounds.

Therefore the map does not correspond to reality in that it shows less water than exists. This minimum picture is reproduced for 80 regions. The figures are also available for 129 regions but the total impression would then be disrupted by miscellaneous urban municipalities, where many water surface areas have been spirited away under buildings and road metalling. This fragmentation is avoided with 80 regions.

The map confirms that on the eastern and southern sandy soils the image of abundant water does not exist, mainly because of their high elevation. Amongst these 31 regions with less than 2% of water surface, 18 have even less than 1%.

The class in the key of 2 to 6% contains 29 regions of differing types: partly still sandy; sea clay areas where the predominance of agriculture has caused the inconvenient ditches to be replaced by drains; coastal regions with considerable areas of dunes; and river clay regions.

The class of 6 to 10% contains the really low-lying peat areas with many excavated lakes (and unrecorded ditches), whilst some areas on the map owe their high percentage to the marginal lakes like those bordering the IJsselmeer polders and the Veerse Meer in the Middelburg region.

There are only four regions in the 10 to 14% class. These are the lakes area of southwest Friesland, the very wet Zaanstreek, Rotterdam because of its large port basins, and Het Gooi on account of the Loosdrecht Lakes within its area as well as the Gooi lake on its northern edge.

Although the top class also of just four regions figures quite conspicuously on the map, their situation is abnormal because the closed-off sea inlets are municipally incorporated.

Map Forty-Five

PROVINCIAL SHARE OF EMPLOYMENT IN MANUFACTURING, 1984

In the post-war growth of Dutch manufacturing industry the number of employees reached a maximum of 1,138,000 in 1965. Under the influence of a prolonged and excessive rise in the cost of labour, its replacement by capital was accelerated after that, causing a decline in the

work force to 1.1 million at the time of the oil crisis in 1973/74. A dramatic 'shake-out' of manufacturing was carried out subsequently, no longer only influenced by the steadily rising labour costs but now also by climbing energy and environmental protection costs, rising interest rates because of increasingly borrowed capital, and fiercer competition from, amongst others, the 'Newly Industrialising Countries' (NIC's). In the ten years between the beginning of 1974 and the date of the map the amount of manufacturing employment declined by province and for the whole of The Netherlands as shown in the table 45.1.

By 1984 this purgatorial reorganisation seemed almost to have spent itself. The map shows the 'surviving fittest', an industry, which after the tense expectations of a 'post-industrial era' in the seventies is once again regarded as the basis without which a tertiary sector remains anaemic and a quaternary can barely be financed. At the same time manufacturing is again seen as the principal means to combat unemployment, which has climbed higher in The Netherlands since 1980 than in almost any other West European country. Therefore the map shows first of all the quantitative ratio between population and industrial workers in the upper two bars. It appears that the share of all manufacturing is greater than that of population in only three provinces. Noord-Brabant exhibits by far the greatest of these discrepancies. Its manufacturing share at 205 per thousand is not only 40% higher than the population share (147 per thousand) but is also the largest of all the provinces. Only Zuid-Holland at 190 is close to Brabant, and these two provinces contain therefore (205 + 190 =) 40% of all Dutch manufacturing employment. Limburg is the most industrialised after Brabant. Its manufacturing share at 94 per thousand is a quarter higher than its share of population (76). Therefore in these two southeastern provinces together are found (205 + 94 =) 30% of the national employment in manufacturing, in comparison with only 22% of the Dutch population. Overijssel is the third outstanding industrial province, yet the discrepancy between the two upper bars is smaller here (73 and 83 per thousand respectively) and has become smaller, especially because of the rapid break-up of the cotton textile industry in the sixties and seventies which was predominant here formerly.

Both the top shares are equal in Zeeland, which is at the same time the smallest of the eleven provinces in both respects. The equality has only come into existence in the last 25 years, owing to the establishment of a small number of large plants on both sides of the Westerschelde, which offers maritime seagoing accessibility.

Table 45.1. *Manufacturing employment (thousands).*

	1974	1985
Groningen	44	36
Friesland	38	35
Drenthe	31	28
Overijssel	93	83
Gelderland	131	111
Utrecht	54	48
Noord-Holland	167	145
Zuid-Holland	207	190
Zeeland	22	25
Noord-Brabant	212	205
Limburg	103	94
Netherlands	1,100	789

In the remaining seven provinces the manufacturing bar is shorter than the population bar. In four of these seven that difference is small. In Friesland and Zuid-Holland it is somewhat larger and the largest in Utrecht, whose central position encourages the establishment of all kinds of national service activities, but has no important locational value for manufacturing in a country that is so small and so excellently opened up.

The remaining four bars reflect the share of each province in the four manufacturing classes employing the largest amount of labour in The Netherlands, together totalling more than 50% of the national workers in manufacturing. If the length of these four bars is compared by province with the length of the bar for all manufacturing and these four positive or negative differences are summarised, small industrial provinces particularly exhibit great inequalities, which corresponds to the theoretical expectation. The dwarf Zeeland surpasses everything through the relatively extreme size of its chemical industry, in combination with the very small size of the three other classes. The string of large chemical plants along the Terneuzen to Ghent canal is responsible for this, including the largest *Dow Chemical*

works outside the USA, while on the northern bank of the Westerschelde is the large *Hoechst* complex as well as a modest *Total* oil refinery. Limburg is also unbalanced by the dominance of the chemical industry which here is based on only one concern, namely DSM, that is *Dutch State Mines*, the former coalmining state company that, through the rebuilding of its carbo-chemical basis after the closing of the coalmines, changed into a purely petrochemical company with the retention of its location thanks to the pipe-line supply of natural gas and naphtha. Friesland is also one-sided, in this case naturally through the predominance of the milk-processing industry.

Only Brabant amongst the large industrial provinces has one extreme specialisation, namely in the electrical industry, naturally on account of the large-scale presence of *Philips* (compare Map 41). Nevertheless the bar for the food industry is also longer than the already extreme length of that of all manufacturing, while almost 20% of the Dutch total machine industry is also located here. The provinces of Noord- and Zuid-Holland exhibit a very balanced picture, as does Gelderland, small-scale Utrecht and the even smaller Groningen.

In conclusion for those used to the volume of industrial labour in large countries it should be stated that in The Netherlands only small numbers are involved. The four manufacturing classes specified in the bar diagrams account for only 135,000, 82,000, 76,000 and 109,000 employees respectively. This represents 51% of all employment in Dutch manufacturing. This percentage differs only from 43 to a maximum of 60% by province.

Map Forty-Six

DEMOGRAPHIC LOAD, 1983

On reflection this map could have been better not done, or at least done differently. The concept of 'demographic load' (further abbreviated to DL) has crept in recently into Dutch demographic statistics. Its introduction on a map is really to succumb to this terminological innovation, which is in substance unusable, if not to say misleading. For 'load' suggests that the income-earning population (globally the age-group from 20 to 65 years) will support the not yet productive (0-19 years) and the no longer productive (65 and older). That is however untrue for the elderly group, at least in the Dutch welfare state, where everyone receives the old-age pension from the age of 65 years which they have saved to a great extent themselves during their working lives. Moreover the great majority of those who have practised a profession also receive a pension that they have again paid for themselves by means of premiums. Therefore the expenses of the elderly in a given region are substantially covered by a flow of money, which comes into the region and originates from pension funds with national coverage. The regional population group of 20-64 years contributes almost nothing to it.

The maintenance of the young people up to 20 years old is also only partly paid for by the regional productive population, namely in so far as it concerns the normal expenditure by parents on their children and in so far as education, recreation and similar necessities of the young are paid for by the municipal or regional government with money that is raised by the local or regional population. However a great deal of such costs are subsidised by the central government by means of the taxes raised throughout the whole country (compare the text for Map 17). All in all there is consequently only to a limited degree some question of a 'load'.

In order to make the difference between the burden of the young and the elderly visible in some degree, a circle symbol has been added on the map to those regions where the young group is larger than the elderly group in respect of the national average ratio between these categories. The 23 regions perceived in this way fall into three subgroups:

1) the areas where a high birth rate has existed for generations without any notable expulsion of these numerous young people. This is typical of Oost-Brabant and adjacent Limburg, where the quotient as described in the map caption is around 3.5;

2) regions where large numbers of young families have recently settled (within, but mainly just outside the Randstad, with quotients of 3.0 to 3.5);

3) regions where the elderly are relatively numerous because of long-term emigration of the young, but where nevertheless the remaining families account for the highest birth rates of The Netherlands, so that the symbol is still needed on the map (to the east of the IJssel, with quotients of 2.5 to 3).

A second objection to the concept of DL is that the size of the three DL-defining age-groups form mutually dependent variables, with the consequence that very different demographic structures can hide behind the same DL. The two adjoining regions of The Hague and Leiden may serve as an example. In the former the categories 0-19 years and older than 64 years are respectively 41.1 and 28.1% of the group 20-64 years. In the region of Leiden these numbers are respectively 50.5 and 18.7%. In both cases the DL is almost precisely the same (respectively 69.1 and 69.2%), but conceals a sharp demographic difference between the size of the young and the old population.

A third objection, especially in mapping is the spread of the DL values. Although the extreme values are considerably far apart (from minimum 61 to maximum 87), 27 of the 39 regions have values between 68 and 78, making it wellnigh impossible to distinguish more than four classes on the map, with the consequence that substantial differences exist between the regions falling within them.

In this way it appears that what is conceptually warped cannot be straightened cartographically and produces a map with little expressiveness.

Map Forty-Seven

PERCENTAGE OF INHABITANTS WITH HIGHER EDUCATION, 1981

The tertiary level of education embraces the universities and a varied collection of schools for higher vocational education (in The Netherlands abbreviated to HBO). The annual number of students in each of these two parts is almost the same.

The map shows all people who, in 1981, had completed such training, by their region of residence. The latter is possibly different from their work region but this chance is small as regions of larger area are chosen. The eleven provinces would however give too rough a picture and besides create the incorrect impression that provincial authorities are large employers and/or have some influence on the location of other companies or universities and HBO colleges. A division into 43 regions has been chosen because the next possible regionalisation, in 80 nodal regions, would offer insufficient space on the map to express both variables visibly.

Of the total Dutch population 9.5% have passed through this third level (11.8% of the men and 7.1% of the women). The spread of the 43 regional values extends from 5.6 to 14.8% around this average. In between the values are so equally distributed that the four bottom classes in the key can be equally wide. For the top class this is only impossible because of one region that amply protrudes with its 14.8% above the second at 13.1%. These latter two are Het Gooi and Haarlem respectively, quite remarkable as neither has a university, and both have only a very small HBO. Yet they are preferred residential areas for the well-off, and Het Gooi especially possesses some large employers with highly trained personnel, among whom are the national radio and television production companies and Philips Telecommunications. All the other six regions in this top class have percentages between 12 and 13. Only one of them is situated (far) outside the Randstad, namely Groningen and its surrondings, which also pulls up the north Drenthe percentage. In this region relatively numerous people with higher education work mainly for the university, many HBO colleges, the provincial authorities, the numerous central government services based in provincial capitals, and other organisations with (macro) regional service functions. The other five regions in the top class do not cover the whole Randstad. Quite noteworthy is the very low score of the Rotterdam-Rijnmond region. Although a corresponding number of highly trained people earn their living in this largest economic engine region of The Netherlands, many of them evidently live outside this area, with the consequence that it is to be found in the lowest class, together with seven peripheral regions. This shortage of better-off inhabitants, and the modest level of cultural life in the city connected with it, have not always worried the municipal authorities.

Outside the West only four of the 27 regions situated there score above the 10% level. These are the two already mentioned around Groningen; Greater Eindhoven because of Philips, a technical university and a strong collection of HBO colleges; and the region with the twin cities of Arnhem and Nijmegen, which have a university in the latter city, a number of HBO colleges in both, and in Arnhem particularly, large employers, such as the provincial government machinery with its associated state services and the multinational AKZO with its head office and central laboratory.

Map Forty-Eight

TAXES PER HECTARE LEVIED BY POLDER BOARDS, 1984

From the viewpoint of human geography there hardly exists a more specific Dutch organisation than the water board. Nevertheless as a study object this has been neglected by Dutch geographers for half a century, and this consequently thwarts an explanation of the provincial variations shown here.

A second handicap is the provincial variation in tasks which the water boards fulfill. They are, it is true, public corporations (i.e. invested with government authority) and so-called territorial corporations (i.e. excercising authority over a precisely delimited territory), both characteristics that also apply to the state, the provinces and the municipalities. However in contrast to these three, the water boards have a much more limited number of responsibilities, which are determined by the provincial government. Therefore there are in principle eleven different sets of responsibilities, which makes the interpretation of this map more difficult. For the more comprehensive the set of tasks, the higher will be the necessary tax to finance it.

A third handicap lies in the nature of the statistics used here about the level of the water board tax. These data are published annually by the Central Bureau of Statistics but unfortunately in a far from ideal form for the purposes of this map. For 1984, 809 so-called levy areas, which are parts of the 269 water boards, were recorded for the whole of The Netherlands. These 809 are grouped into 20 classes of tax levels per hectare without their surface area being given. Therefore it is not possible to 'weigh' these classes by their territorial extent. That shortcoming naturally applies also to the four classes to which the 20 are reduced on the map for the sake of legibility. These four classes have had to be limited in such a way that in each of these four about a quarter of the 809 areas are to be found, namely from below, the lowest levy, to above 24, 30, 24 and 22% respectively of these 809. This percentage distribution is indicated by dotted lines in each provincial rectangle, in order that the percentage division of the provincial levy areas can be compared with the nationally averaged division across the four classes. This applies once again only to the number of levy areas, irrespective of their unknown extent.

In elucidating the map it must first be repeated that the set of responsibilities of the water board can differ by province and therefore also the distribution of the tax levels across the four classes. There is no space of course to present all these differences. However all water boards in all provinces have in any case the task of maintaining the groundwater level at the mark officially set by levy area. Apart from a few weeks in summer a surplus of water always exists everywhere in The Netherlands, so that the main task of the water boards is draining this away. That is easier and consequently cheaper in the areas lying above sea level in the eastern and southern provinces than in the West and North, where a large part of the surface area lies below sea level and the surplus water has therefore to be pumped out of the polders.

This difference already explains to a large extent why the bars in the highest levy class are very short in Gelderland, Brabant and Limburg and also shorter than the national average in Overijssel and Drenthe. Friesland appears here as an anomaly, although its eastern quarter is above sea level. The Frisian water boards are relatively low-budget because the province pays a part of the costs of water control and also owns the greater part of the waterways along which the water surplus is carried off to the sea. Moreover the water boards in the low-lying middle of the province have a large number of lakes at their disposal

in which the water from the polders can be temporarily stored, so that less pumping capacity is needed than in districts without such storage reservoirs.

In general water board costs are quite dependent on whether or not the boards themselves own the discharging system to the sea and have, therefore, to maintain it and the pumping installations belonging to it. This ownership varies considerably by province. Another general factor is the location of the final outflow points on the coast. In the southwest and the northeast corner of The Netherlands tidal ranges are much greater than in the central areas so that it is possible to allow water to flow freely into the sea at low tide instead of having to pump it away by means of large pumping stations.

This explanation however does not hold in Groningen. There are other causes for the exceptionally high number of levy areas in the highest class. About half of Drenthe drains in a northerly direction via Groningen without the water boards in Drenthe bearing the costs of it. Secondly Groningen consists to a great extent of arable land that requires a deeper and quicker drainage than meadow areas. Thirdly nowhere else in The Netherlands does an extensive canal network lie so high above sea level as in the fen colonies of Groningen and Drenthe. Water from the IJssel Lake has to be conveyed via Friesland to keep these canals filled. Fourthly Groningen has a disproportionate number of levy areas (141 of the national 809), which implies accumulation of levies.

Noord-Holland also exhibits an 'expensive' distribution. Here there are striking disparities in levels below sea level over short distances, that is to say many pumping-engines and waterways. Secondly this province has the most horticultural levy areas where the most exact maintenance of the groundwater level is necessary. Thirdly there are relatively extended arable areas. Fourthly the municipality of Amsterdam does not contribute.

On the other hand the province of Utrecht is exceptionally 'inexpensive'. A considerable part of it consists of a range of hills without surface drainage, bordered on the east side by the Gelderse Vallei, which is at a high enough elevation to allow the water received to flow without being pumped towards the IJsselmeer. To the west of the range of hills the Amsterdam-Rijnkanaal was dug between 1932 and 1952 by the state which also paid for all the adaptation works of the water board areas involved. Large quantities of water are collected in Utrecht for drinking water for Amsterdam, so that the water boards do not have to get rid of it. Finally nearly all the larger drainage waterways in Utrecht are owned by the state or the province and therefore are not a cost to the water boards.

The above illustrates that every province requires a special explanation. The costs of water pollution abatement are not included in this map. They are financed in another way and moreover it is not a task for the water boards in quite a few provinces (see information with Map 14).

Map Forty-Nine

ELECTION RESULTS FOR THE THREE LARGEST POLITICAL PARTIES, 1982 AND 1986

The total support for the three largest parties depicted here amounted to 83% in 1982 and 85% in 1986. That is remarkably high in a country with a proportional electoral system without a vote threshold and any form of districts in an electoral sense, a situation which promotes the existence of small parties. Given the number of enfranchised voters of about ten million and the number of seats in the Second Chamber of 150, about 65,000 votes are enough for one seat in the Chamber. Indeed about 20 parties took part in the elections in 1982 and 1986. However only twelve of them gained at least one seat in 1982, and just nine in 1986. The three largest parties are not threatened in equal measure by these small parties. On the left alongside the PvdA exist no less than five small parties, and many left-wing voters exhibit a fluctuating preference between these six. There are, alongside the large CDA in the political centre, for the Christian voting electorate only three small parties and these possess many loyal voters, so that the CDA is less uncertain about its support than the PvdA. The VVD has least to suffer from competition by minority parties, mainly because

hardly any parties exist in The Netherlands which would be called right-wing in other countries. Conservatives in The Netherlands have no party of their own, and if they do not wish to vote for one of the smaller Christian parties, they have no alternative other than the VVD, in spite of its being a liberal party in terms of its programme.

The rapid decline of the Christian voters in the sixties has already been mentioned in connection with earlier maps. This led to the fusion in 1975, as stated in the footnote to the map. Since then the thus formed CDA has carried on a neck and neck race with the PvdA for the position of the largest party. Table 49.1 presents the support of the three largest parties in the last 15 years, not only for the reason stated above but also for the interpretation of the map.

First in this table it can be seen that the PvdA fluctuates more than the CDA. Secondly both parties exchange the first and second positions with each other. Thirdly 1982 and 1986 produce more striking outcomes than the previous years, the very reason for this map.

In 1982 the VVD obtained a sensationally high percentage in comparison with only a year earlier, only to fall just as far back again in 1986 as they had climbed from 1981 to 1982. The CDA, which scored lower in 1982 than had occurred since 1972, made such a great leap forward that they came higher at the polls than had been the case since 1972. This win in respect of 1982 was almost as great as the loss of the VVD, so that the CDA and the VVD together gained practically as much support in 1986 as in 1982, when they had formed a new government together, which had carried out spectacular economies in the period 1982-86. Obviously these unpopular measures considerably increased the sympathy of the voters for the opposition, in this case the PvdA, and equally obviously, lowered that for the VVD as a government party. It is spectacular however that the CDA as the largest party in the government in 1982-86 suffered absolutely no damage from the dramatic policy of economies mainly carried out by them. On the contrary, the voters gave the CDA 5% more of the vote in 1986 than in 1982, which is a great shift by Dutch standards.

Table 49.1. *Voting results (percent).*

	1972	1977	1981	1982	1986
PvdA	27.3	33.8	28.3	30.4	33.3
CDA	31.3	31.9	30.8	29.4	34.6
VVD	14.4	14.9	17.3	23.1	17.4
Together	73.0	80.6	76.4	82.9	85.3

This abnormal reward has been almost totally ascribed to the personality of the first candidate on the CDA list, who from 1982-86 was also Prime Minister and as such had explained his government's measures in an apparently convincing way at least once a week on television. He had also in other ways earned respect for his performance, even abroad, which a Dutch government leader seldom succeeds in doing. The opposite holds for some of the leading VVD politicians. The gains of the PvdA in 1986 can also be ascribed to one personality. Just before the election in 1986 the parliamentary leader since the sixties resigned his position to a younger man, who had enjoyed positive recognition for many years as leader of the largest Dutch trade union.

The considerable national victory of the PvdA and CDA in 1986 and the relatively colossal losses of the VVD appear to manifest themselves in all provinces on the map, although with differences that are worth mentioning here. The PvdA made the greatest gains in the former Catholic bulwarks of Brabant and Limburg but not at the cost of the CDA, which also made gains here but at the cost of the VVD, which took its greatest percentage losses in these provinces. There was therefore a defection of voters who had already stopped voting on confessional grounds in 1982. On the other hand many more voters in the much longer de-Christianised West preferred CDA in 1986 than in 1982. Because of the large number of voters in this part of the country this shift was very significant nationally.

The only province where the CDA percentage dropped slightly and that of the PvdA rose abnormally is Flevoland, a province which came into being just five months before the election on 1.1.1986 and where a large number of 'red' Amsterdammers had settled between 1982 and 1986 in the two new towns of Almere and Lelystad.

If the difference by province is ascertained between each party's share of the vote and its national average, and these differences are summed, a deviation index is obtained. The theoretical expectation that this index will be lower as the number of voters in a province is larger is only partly realised. The lowest indices (5 to 7) appear in the two smallest provinces (Flevoland and Zeeland) but also in the largest (Zuid-Holland) and a medium-

sized (Gelderland). The most extreme maverick is Groningen that already exhibited the highest deviation in 1982, (namely 27.4 points more than no. 2) but became even more exceptional in 1986 with an index of 30 (11 points higher than no. 2). The cause lies with the two largest parties. The PvdA gained the highest percentage here in 1982 and 1986 of all the provinces and the CDA the lowest. This electoral profile also holds for Drenthe to a lesser degree, with a noticeable lower index (18 in 1982, 19 in 1986). Brabant and Limburg are two other exceptions because in spite of the decline of the Roman Catholic Church these two still scored abnormally high CDA percentages in both years, while Limburg's deviation was increased by highly negative VVD scores.

With respect to 1982 the index in 1986 rose slightly in three provinces and stayed the same in two. In the other seven this deviation dropped, by five points in three cases (Friesland, Zuid-Holland and Limburg) and only in the exceptional case of Flevoland by eight points. This indicates that the twelve provincial pictures in 1986 more closely approximated to the national average election result than was the case in 1982.

Map Fify

FOUR CLASSES OF POPULATION DENSITY, 1985

To conclude this series of maps the theme chosen can be considered to be the most striking characteristic distinguishing The Netherlands, from the viewpoint of human geography, from nearly every other country except city-states, namely the extremely high population density combined with very high prosperity. This density amounted to 426/km² on 1.I.1985, as high as South Korea and, amongst approximately 160 countries in the world, only surpassed by four small island-states, Taiwan (as small as The Netherlands), and impoverished Bangladesh which stands alone at the top with almost 700/km². On the other hand 30% of all states remain below 20/km², 50% below 40/km² and 70% below 100/km².

In 1985 it was 20 years since the decline of the Dutch birth rate had began, from more than 20 per thousand until 1965 to 18 in 1970, 13 in 1975 and less than twelve in 1983. The net reproduction rate had also risen until 1965 (to 1.47); after that it fell to below 1 in 1973 and only 0.70 in 1983. Many causes for these demographically very rapid changes have been advanced, but among them a widespread perception that the country must not become fuller is seldom mentioned. In spite of this it is becoming fuller; a decline in the total number of Dutchmen will not set in before the first or second decade of the 21st century, if the trends mentioned above continue.

Until that moment the density will also keep on rising. This occurs however so gradually from year to year that the perception of 'empty', 'full' or 'too full' scarcely seems able to alter as new generations are added to the population who consider the existing densities to be normal, although they have become high for the older generation. A difference between The Netherlands and some of the other similarly densely populated countries such as Belgium, Japan, South Korea and Taiwan is the much more dispersed density in The Netherlands, while these other countries have at their disposal relatively extensive parts of their territory which are almost empty. Only one of the 129 regions on the map, in spite of their average extent of 260 km², has a density of something under 50, and that region is composed of the four eastern islands off the north coast. The minimum density on the Dutch mainland however is at least 100 everywhere. The interesting question, which as far as is known has never been answered, is in how far the 'crowdedness' of one's own residential and employment area is differently evaluated by people who are able to visit emptier areas at weekends and for holidays. The latter applies to the Dutch who took 4.5 million holidays in 1983 in so-called tourist areas inland and 5.3 million abroad, certainly almost as many experiences of emptier areas than back home. There is no doubt about the fact that in the seventies all Dutch regions with more than 1200 people per km² have seen a migration loss. That seems to be a sort of ceiling above which the crowdedness is regarded by many people as being so great that they decide to move somewhere else. In the years 1980-85 this rule was temporarily rendered inoperative by abnormal circumstances, namely very high

unemployment and a sharp decline in house prices, both resulting in a sharp decrease in mobility.

In contrast with the usual mapping of population density in dots or choropleths over the whole country (as was also done in Map Seven), regional density values are grouped into four classes which are each depicted on a separate map. This led moreover to such a small dimension for each of the four maps that municipalities could not be used, but the next finest-meshed division in 129 regions could. These areas were first ranked from the most thinly to the most densely populated. As a second step their inhabitant totals were accumulated in such a manner that about a quarter of all Dutchmen were resident in each class, and thus also on each map. This procedure naturally led to the area of the regions combined in this way becoming smaller as the density rises. On the first map 48% of The Netherlands is hatched, on the second 38%, on the third 12%, so that on the fourth just 2% of the surface area remains over for the 3.6 million inhabitants stated.

The adjectives chosen for each group of regions is not supported by any research but is related to the average density for the whole country (426/km²). The perceived density is actually still (much) higher because 40% of Dutchmen live in municipalities with more than 50,000 inhabitants, and barely 25% in municipalities with less than 20,000 people where the built-up area has no urban compactness. Nevertheless the 12 million inhabitants from the 'livable', 'tight' and 'crammed areas' would perceive the relatively extensive areas as 'empty', where the density does not reach higher than half the average figure for the country as a whole (thus not higher than a rounded-off 200/km²). These 'empty areas' are broadly situated in the northeast and southwest of the country and make up 48% of the Dutch land surface area.

Those areas whose density is between 300 and 600 are denoted as 'livable', which is the average situation for Dutchmen and is for that very reason perceived as acceptable, although it is only shared by the countries mentioned earlier as well as Belgium and Japan. Perhaps these 'livable regions' should have been subdivided by the A-A line (Alkmaar-Arnhem) mentioned earlier. To the northeast of this line the regions of Overijssel and Gelderland nearly all exhibit a density of just 300 and are moreover mainly bordered by 'empty areas'. Southwest of this line regions in this class in Brabant mainly exhibit densities of 400 to 600 and encircle moreover a series of towns so that they have to suffer considerably from through traffic. This factor, which increases the perception of crowding, is even more valid for the 'livable areas' round or in the Randstad. These are besides characterised by absolutely flat and treeless polder land, so that the inhabitants find their horizon to a great extent occupied by urban development, which can increase their feeling of being crowded, even if the statistical density of their residential area is only 'average'.

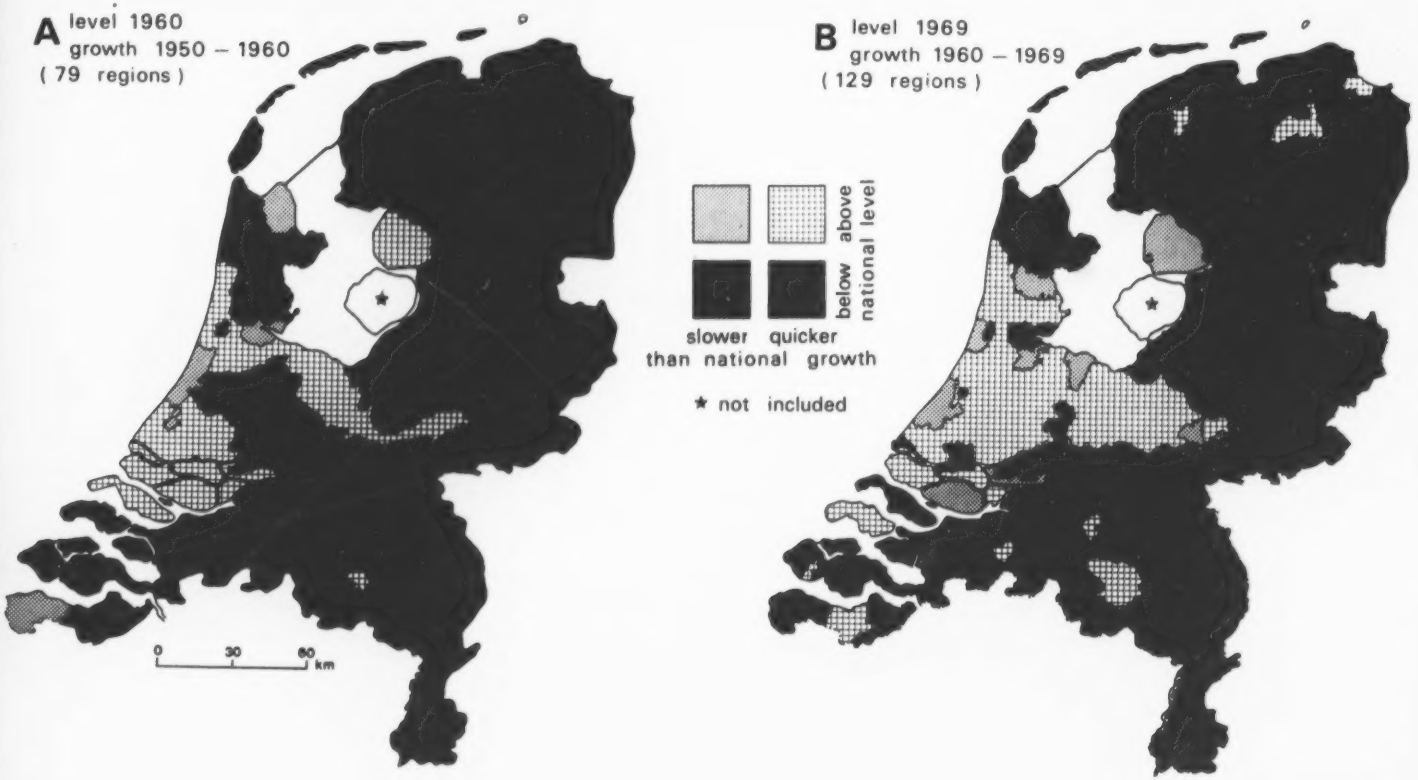
In the 'tight areas' densities climb quickly from two to four times the national average. That also implies a rapidly rising share of the inhabitants living in flats with all the concomitant 'car accumulation' (as already outlined in Map Fifteen) parked in the residential streets and also driving in the remaining space, threatening everybody with physical danger, visual burden and noise. All this applies *a fortiori* to the 'crammed areas'. Already in 1974 L. Levy wrote in his too little known report 'Population Impaction, Health and Social Adaptation in The Netherlands':

> 'The results of the national study yield fairly clear-cut findings with respect to the relationship of population density to male deaths from heart disease, deaths from all causes, admission rate to general hospitals, admission rate to mental hospitals, rates of delinquency, illegitimate births and divorce'.

This research was based on the same 129 regions but in the sixties, when the average densities in The Netherlands were 15% lower than in 1985, only 2.4 million private cars were owned in 1970 as against 4.9 million in 1985, and social discipline was much higher.

Maps

Level of nominal average gross income per taxpaying inhabitant in 1960 (A) and 1969 (B), and its percentage growth during 1950-1960 (A) and 1960-1969 (B), both in comparison with the national average, by economic-geographical region.



Basic source: Central Bureau of Statistics

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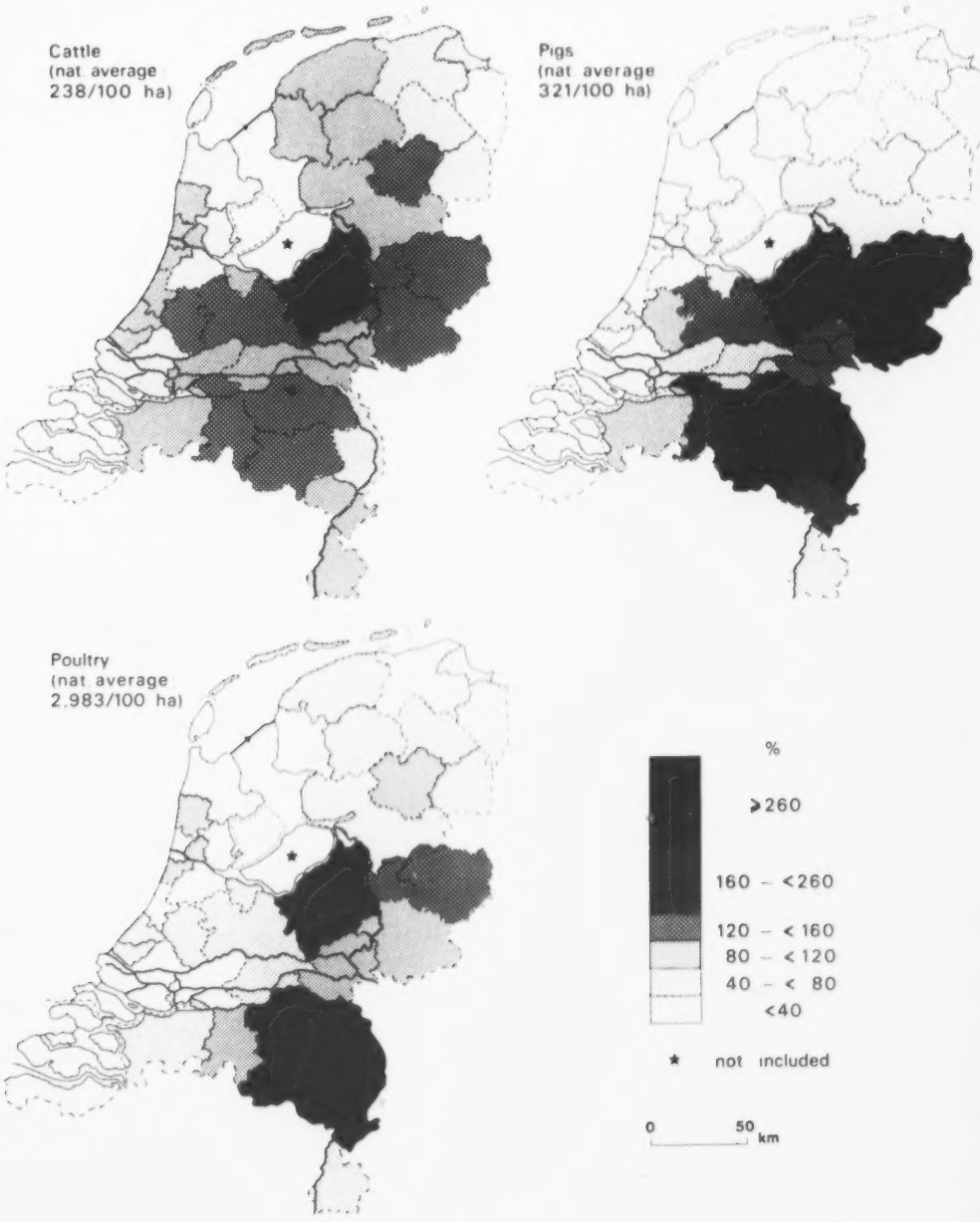
68 (1977) 4

2. LIVESTOCK

Density of cattle, pigs and poultry. Their numbers per 100 ha of cultivated land (incl. grassland) in percentage of the national average, May 1974, by nodal region.



Basic source: Central Bureau of Statistics

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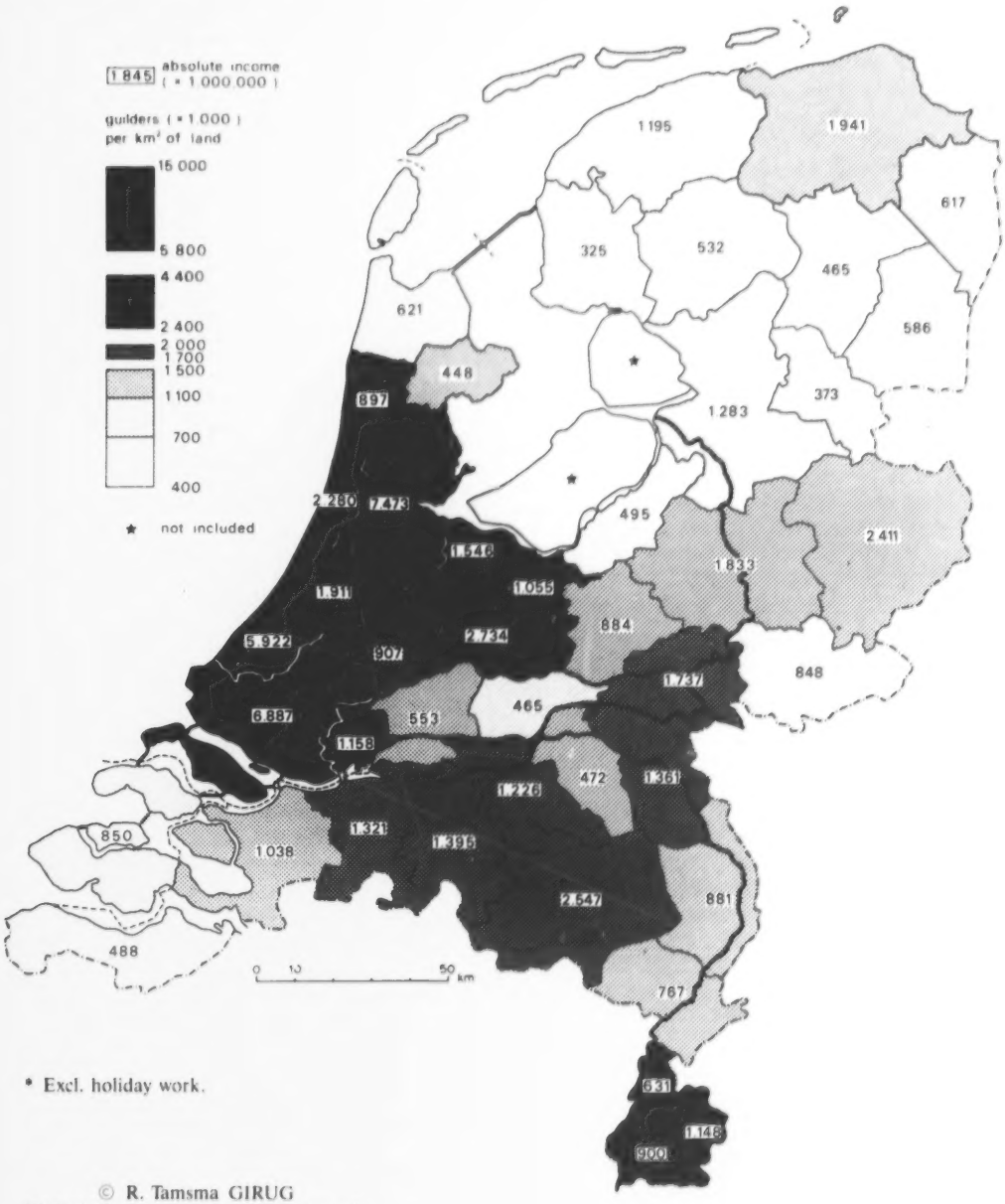
3. INCOME

Total income* of all taxpaying inhabitants in 1969, in absolute amounts and per km² of land, in each of the 44 nodal regions as delimited in the 1974-bill on supra-municipal government.



* Excl. holiday work.

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68 (1977) 6

Basic source: Ministry of Home Affairs and Central Bureau of Statistics

79

4. EMPLOYMENT

Non-Dutch males employed in manufacturing (I.S.I.C.-divisions 2-3) at 28.2.1971 (Census), by economic-geographical region.

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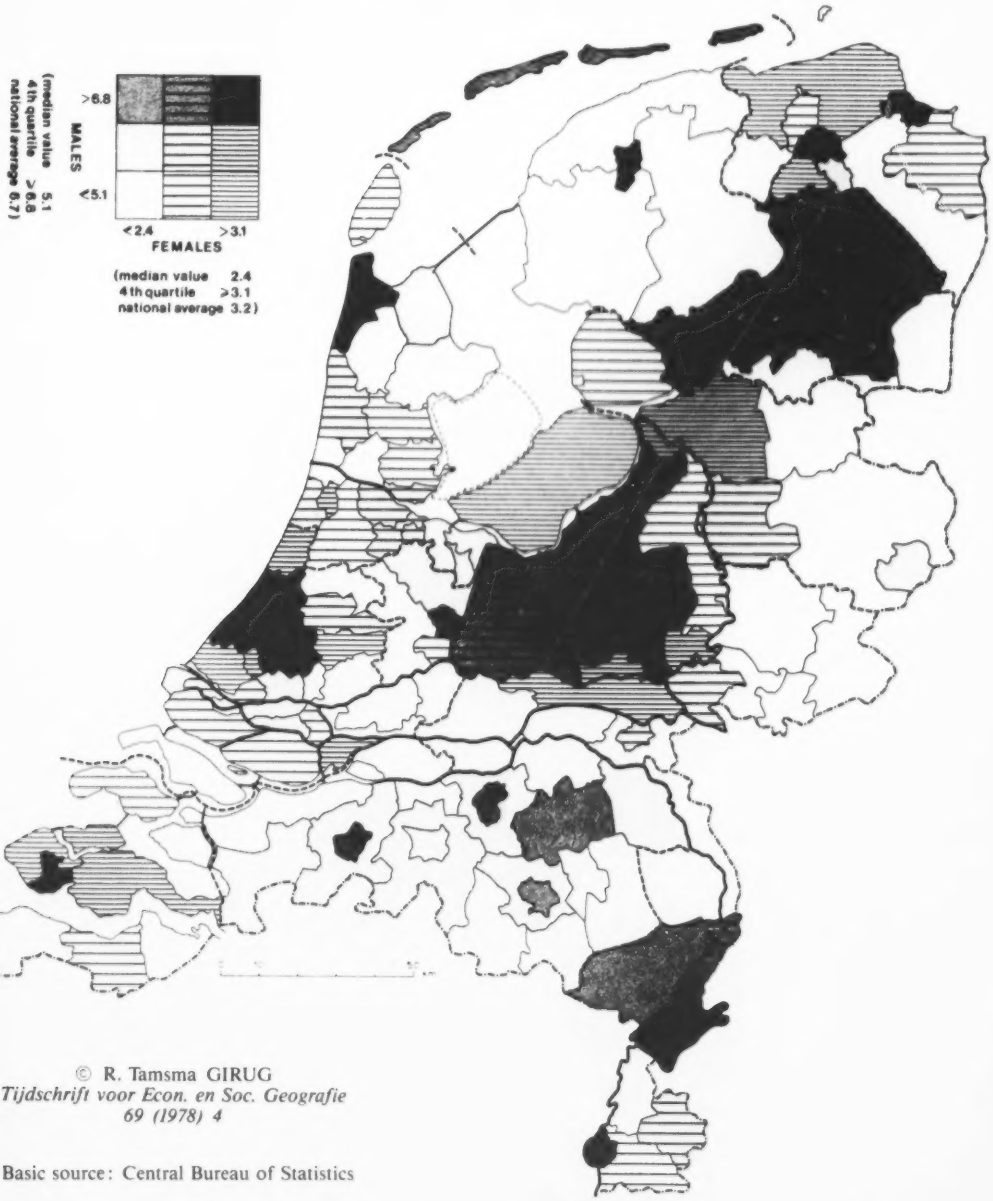
Basic source: Central Bureau of Statistics

80

5. EMPLOYMENT

Males and females employed in industry class 90 (= public administration, defense, and social insurance), in percentage of total male, resp. female employed population*, by economic-geographic region of residence, at 28.II.1971 (Census).



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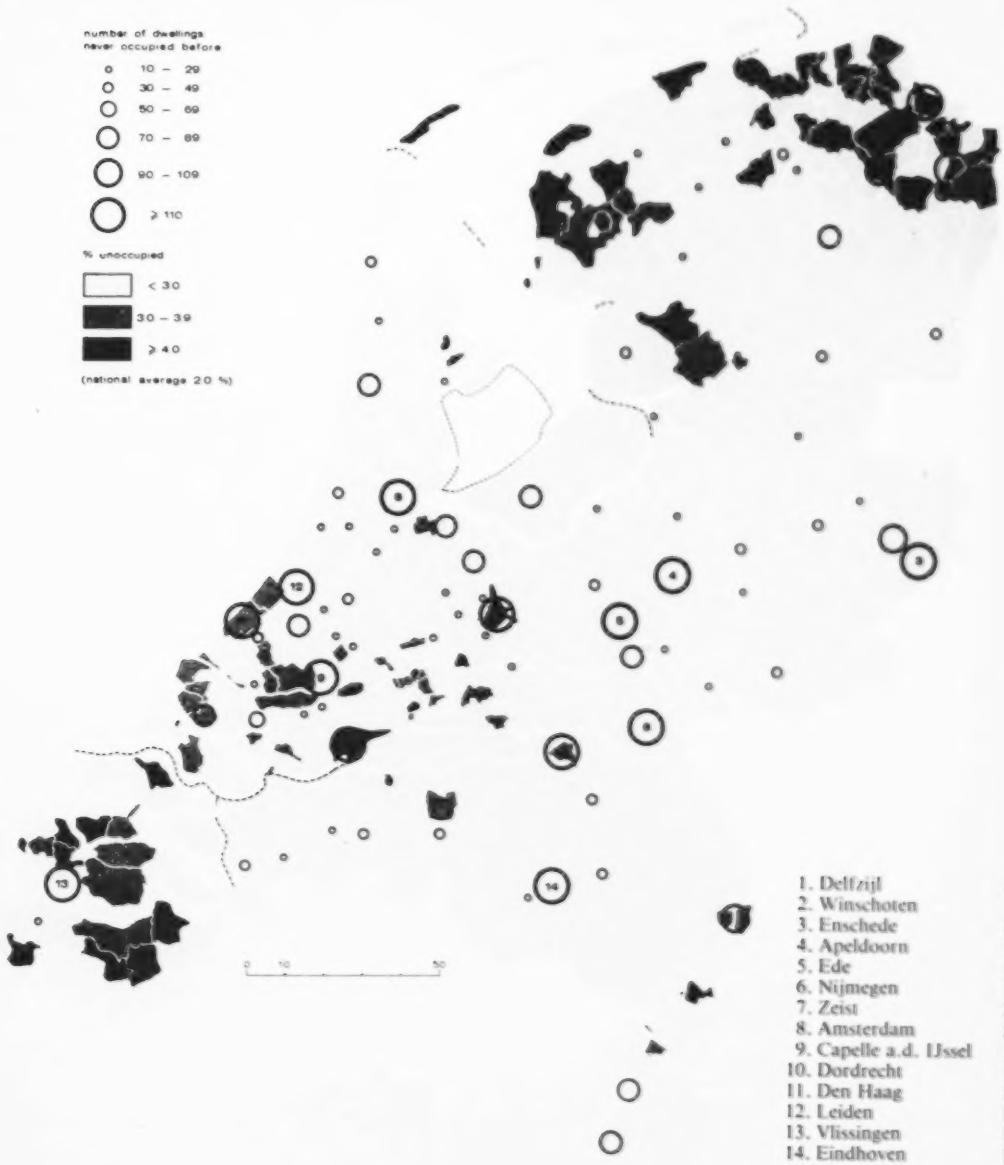
Basic source: Central Bureau of Statistics

* Total employed population: 3,540,220 males and 1,241,520 females, of which resp. in class 90: 237,990 males and 39,885 females.

81

6. HOUSING

Municipalities with at least 10 empty dwellings never occupied before, and percentage of all their dwellings being unoccupied, at 1.X.1977.



1. Delfzijl	203
2. Winschoten	120
3. Enschede	202
4. Apeldoorn	132
5. Ede	120
6. Nijmegen	180
7. Zeist	382
8. Amsterdam	506
9. Capelle a.d. IJssel	115
10. Dordrecht	124
11. Den Haag	188
12. Leiden	117
13. Vlissingen	161
14. Eindhoven	198
15. Oss	203

Basic source: Central Bureau of Statistics

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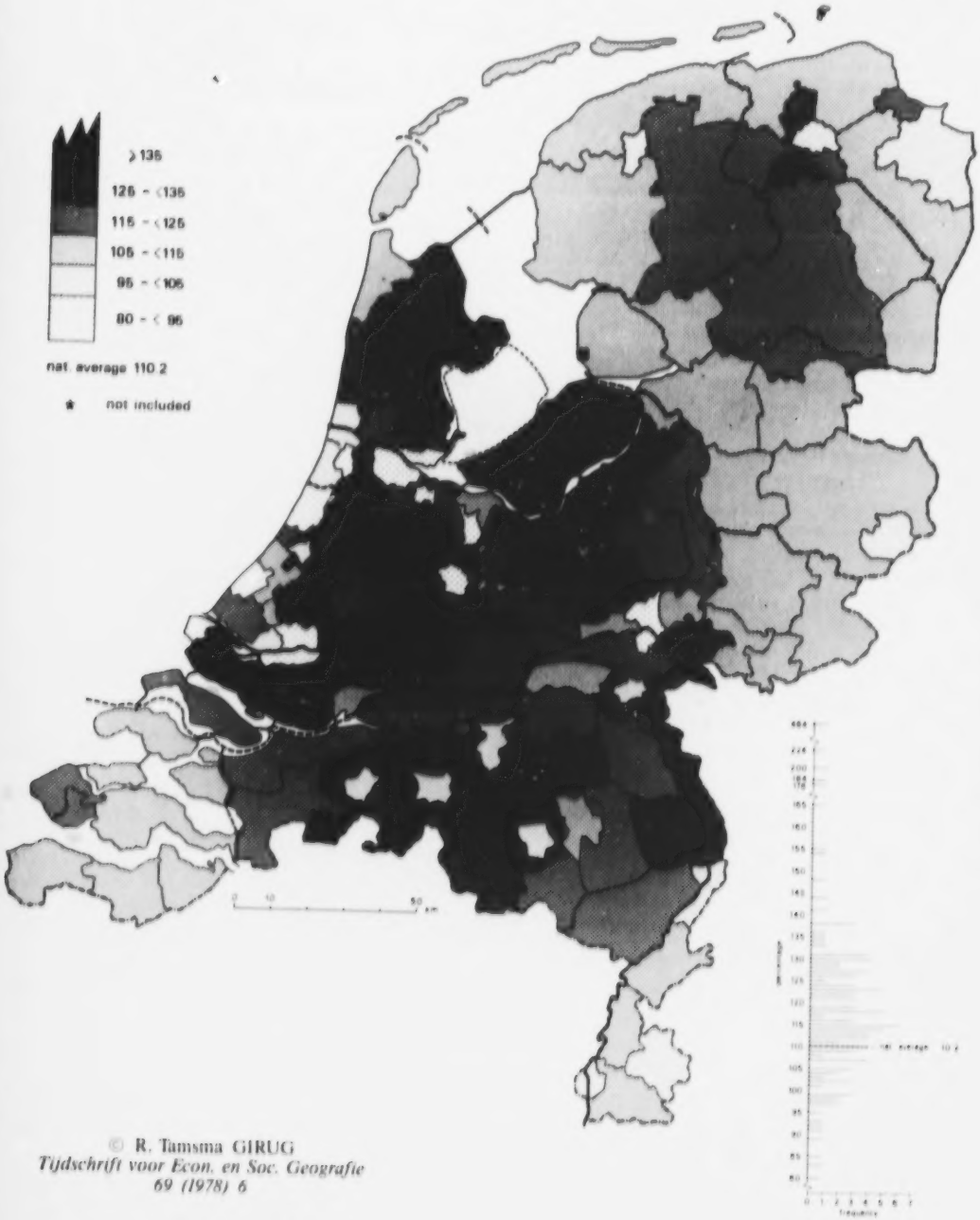
82

7. POPULATION

Population at 1.1.1977 in % of the population at 1.1.1967, by economic-geographic region.



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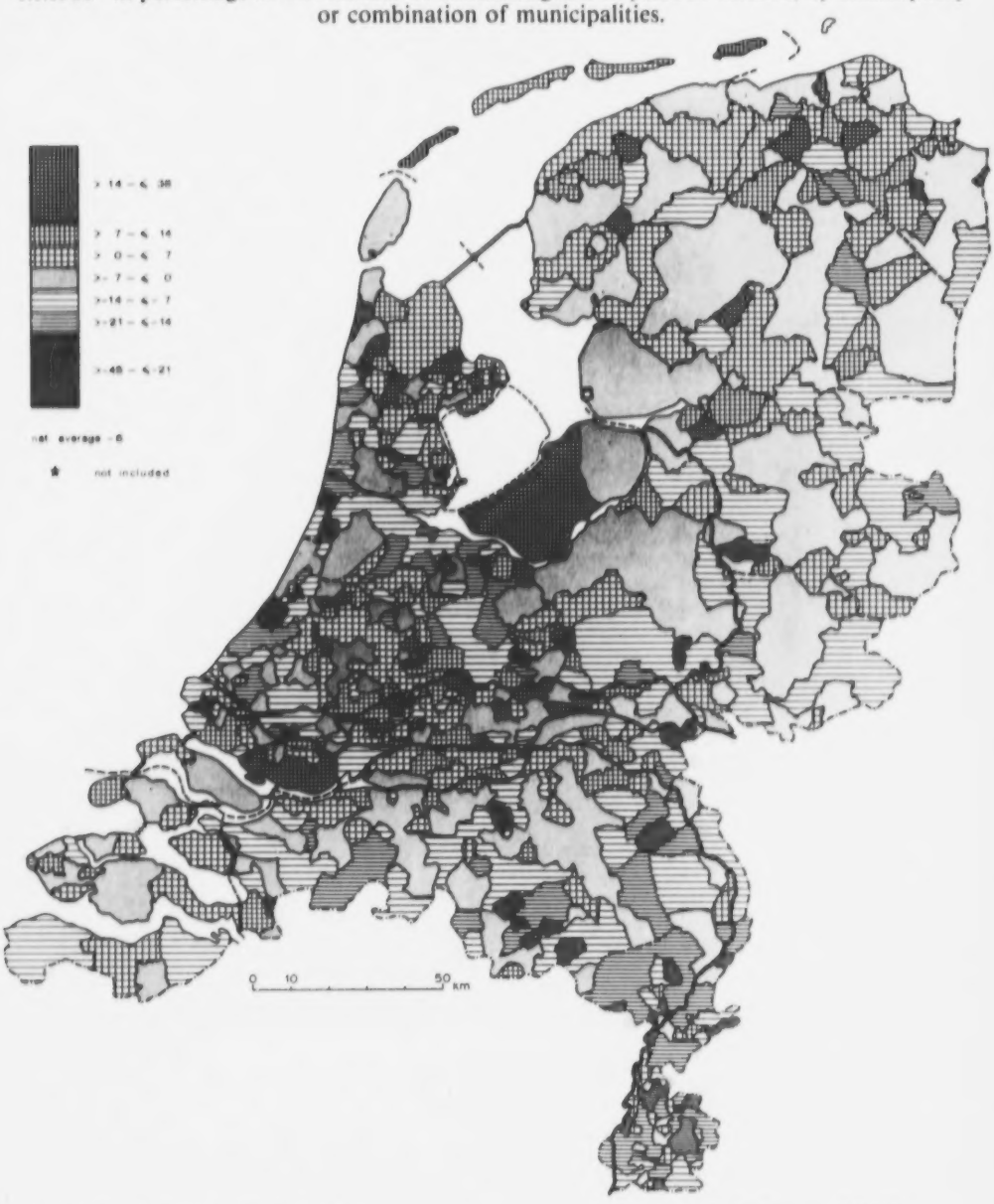
69 (1978) 6

Basic source: Central Bureau of Statistics

83

8. EDUCATION

Change in elementary school population 1975-1980: number of children aged 6-11 years at 1.1.1980* in percentage of the number of children aged 6-11 years at 1.1.1975, by municipality or combination of municipalities.



Basic source: Central Bureau of Statistics

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* Determined by reducing the existing population aged 1-6 years at 1.1.1975 by the number expected to die during 1975-1979.

84

9. DIVORCES

Number of divorces per 1,000 contracted marriages per annum, on the average over the periods 1935-39, 1955-59, 1960-64, 1965-69 and 1970-74, in the Netherlands and in each of the eleven provinces.

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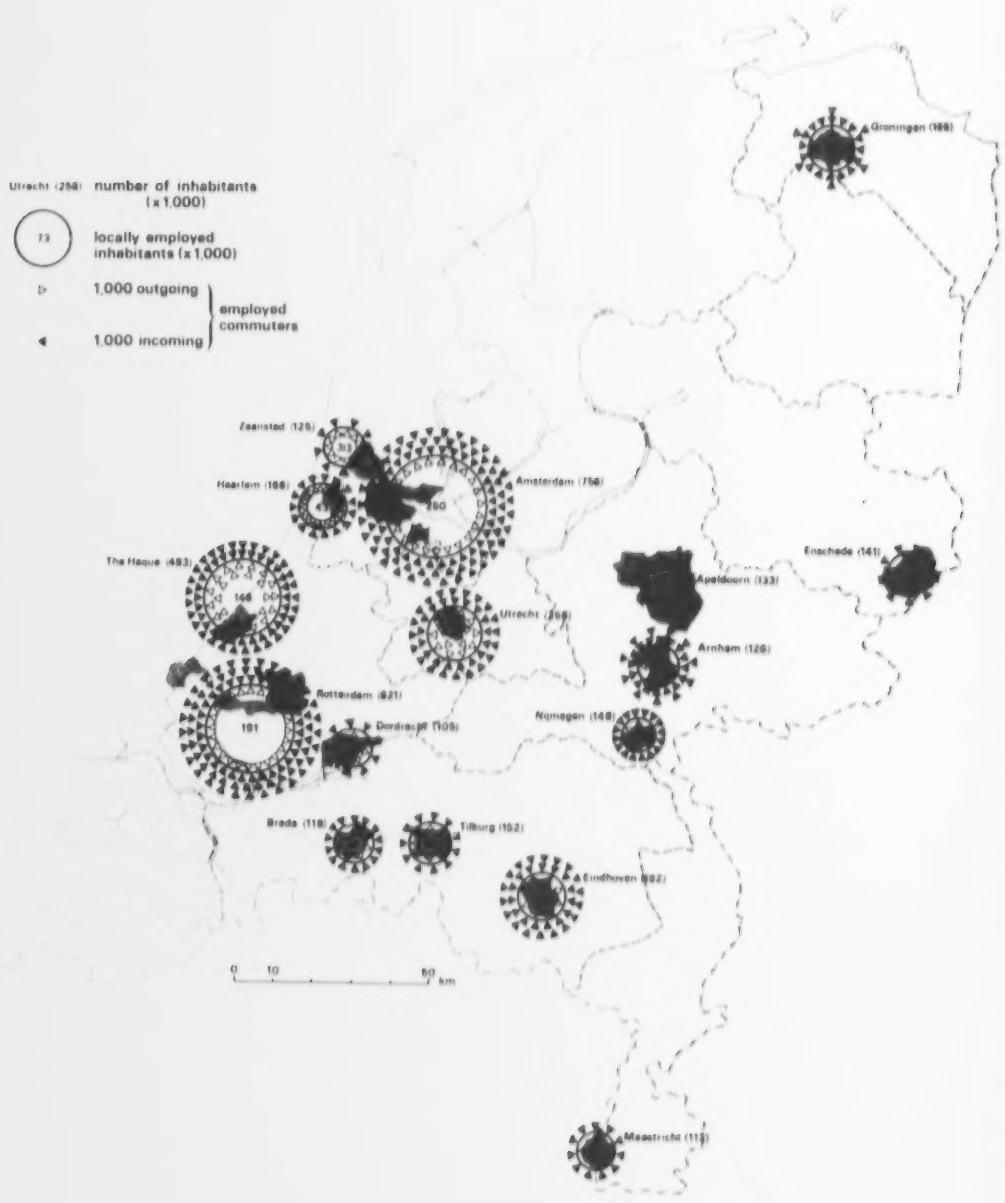
Basic source: Netherlands Interuniversity Demographic Institute

85

10. COMMUTING

Municipalities having ≥ 100,000 inhabitants of which ≥ 25,000 are locally employed, and their number of outgoing and incoming employed commuters, in 1975.



Basic source: Central Bureau of Statistics
Arbeidskrachten telling 1975 table 22

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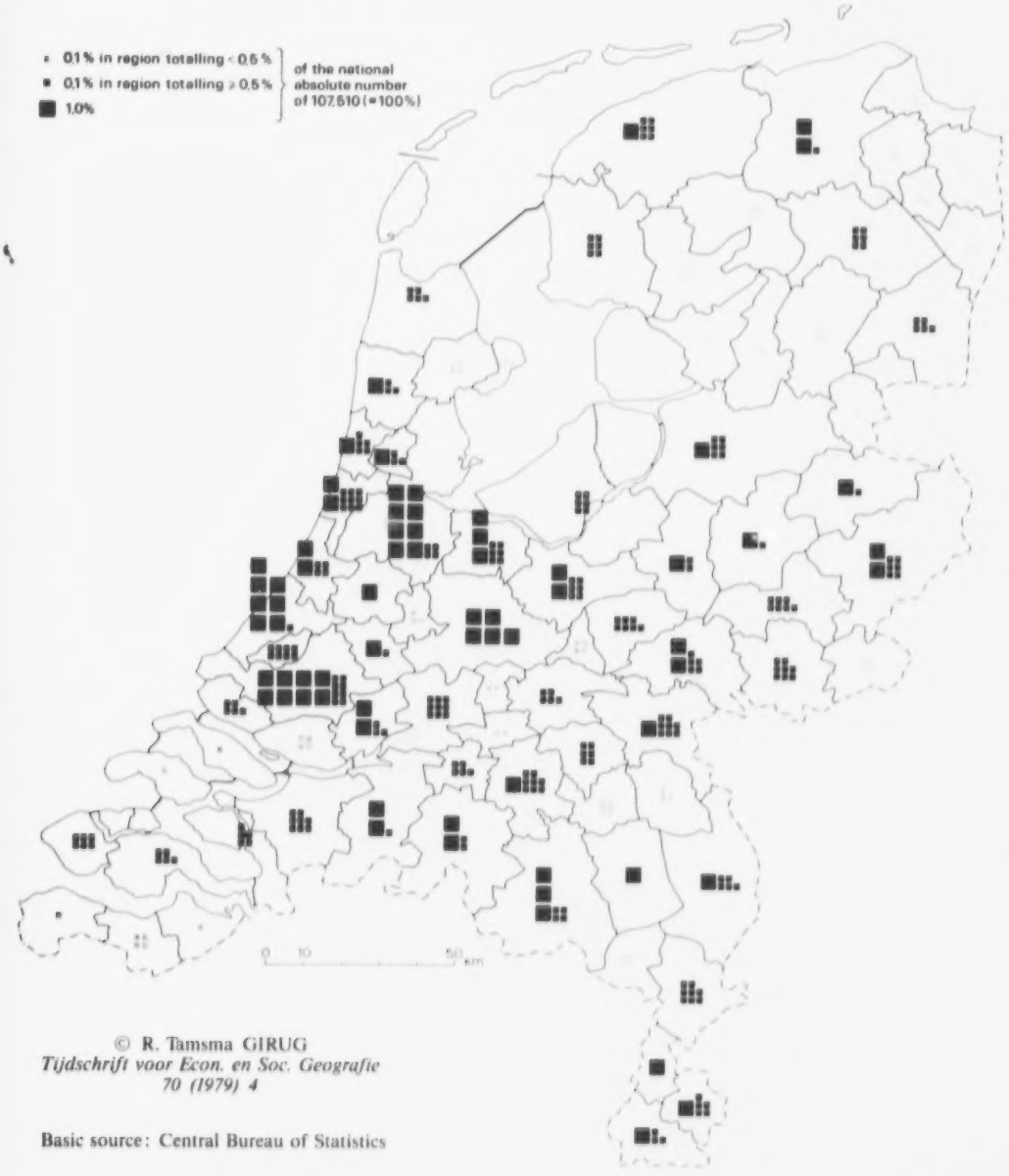
70 (1979) 3

86

11. DECISION MAKING

Policy making and other higher managing functionaries* in percentage of the national total of such functionaries, at 28.II.1971 (Census), by nodal region of residence.



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Basic source: Central Bureau of Statistics

* i.e. people employed by
1. national, provincial or local government in order to (co)determine public policy, design or amend official regulations, and/or execute such policies through heading ministeries, divisions, etc.;
2. private or public enterprises or organisations in order to plan, organise, coordinate and/or guide proceedings and operations.

87

Inland migration between adjacent provinces, 1970-1974

% of total emigration from each province going to adjacent provinces

• = 1%

% of total immigration into each province coming from adjacent provinces

• = 1%

Basic source: Central Bureau of Statistics

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13. SPORTS ACCOMMODATIONS

Number of inhabitants (× 1,000) per available football field, hockey field, gymnasium, tennis court, covered swimming pool and open air swimming pool, at 1.1.1975, by nodal region.

Basic source: Central Bureau of Statistics

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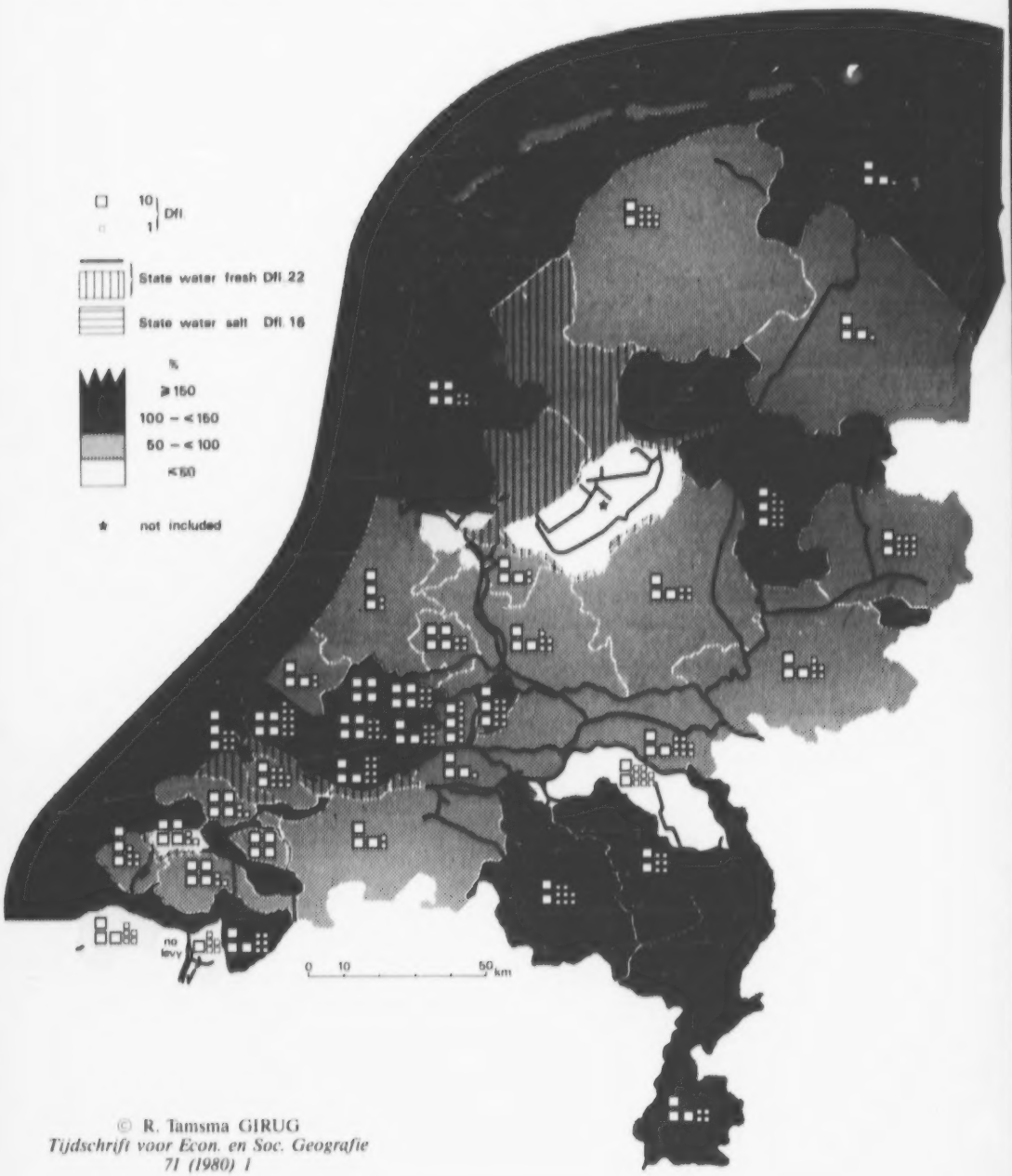
89

14. WATER POLLUTION

Levies (in Dfl.) for water pollution per 'inhabitant equivalent' (= 54 gr. O_2/24 hours, B.O.D. 20/5) in 1979, and their percentage increase during 1975-1979, by 'water quality control area'.



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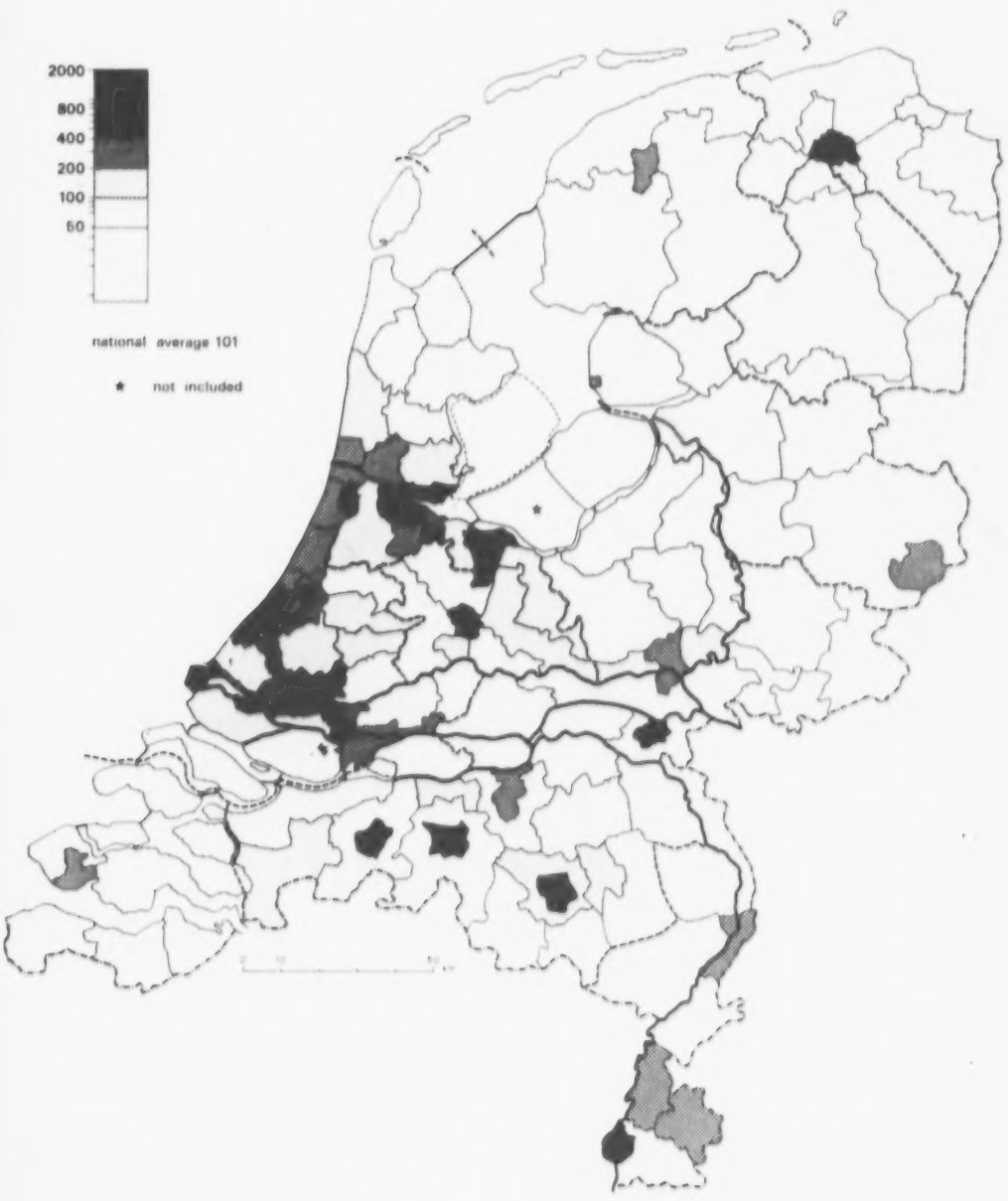
71 (1980) 1

Basic source: Government Note on Environmental Levies to Parliament, d.d. 10.VII.79

15. CARS

Number of passenger cars per km² of land, on 1 August 1975, by economic-geographic region.



Basic source: Central Bureau of Statistics

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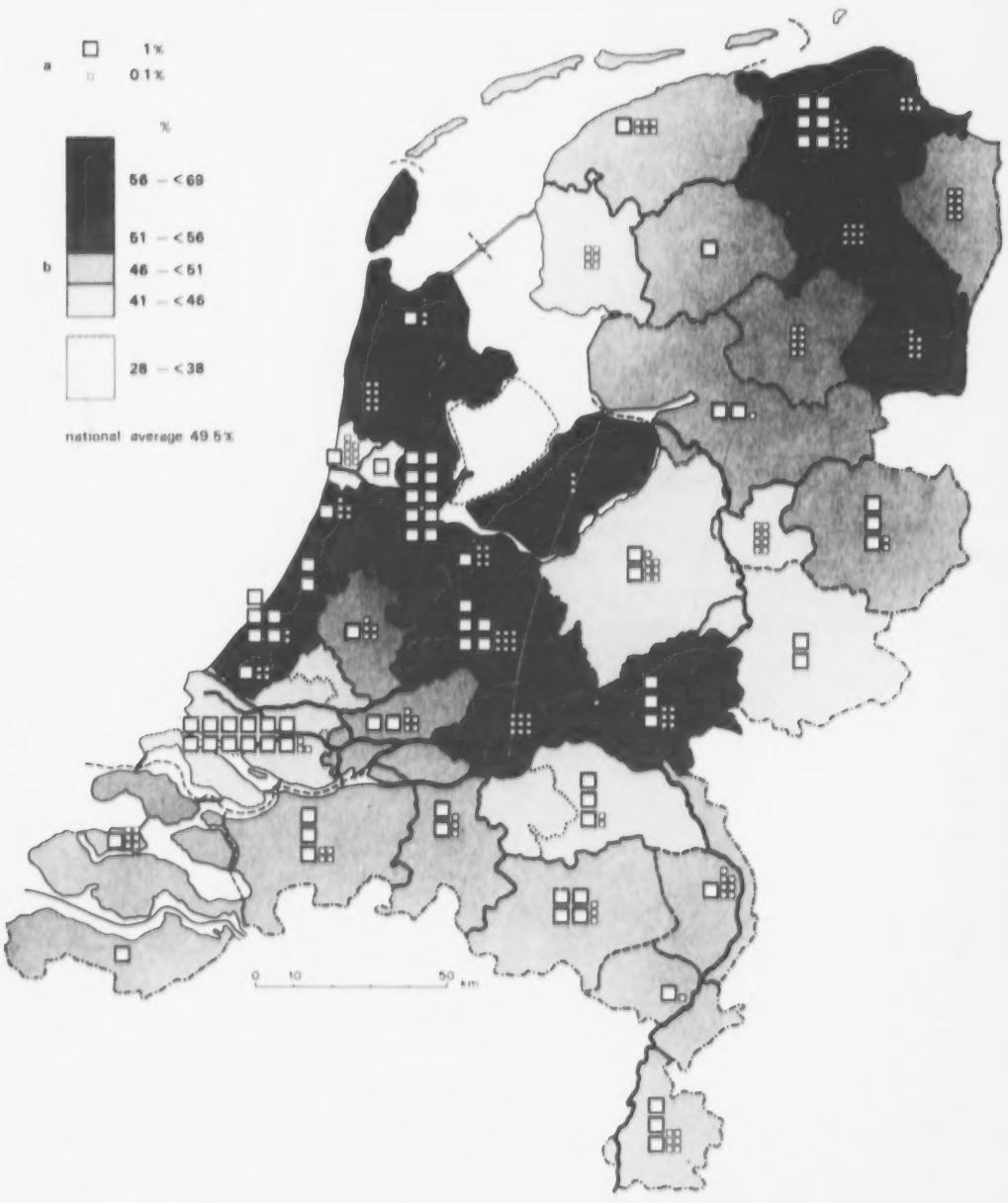
91

16. REGIONAL PRODUCT

Gross regional product at market prices (= production value less purchased inputs) of all non-governmental businesses, in % of a) the combined gross regional products of all regions, and b) each region's production value, in 1975, by nodal (COROP) region.



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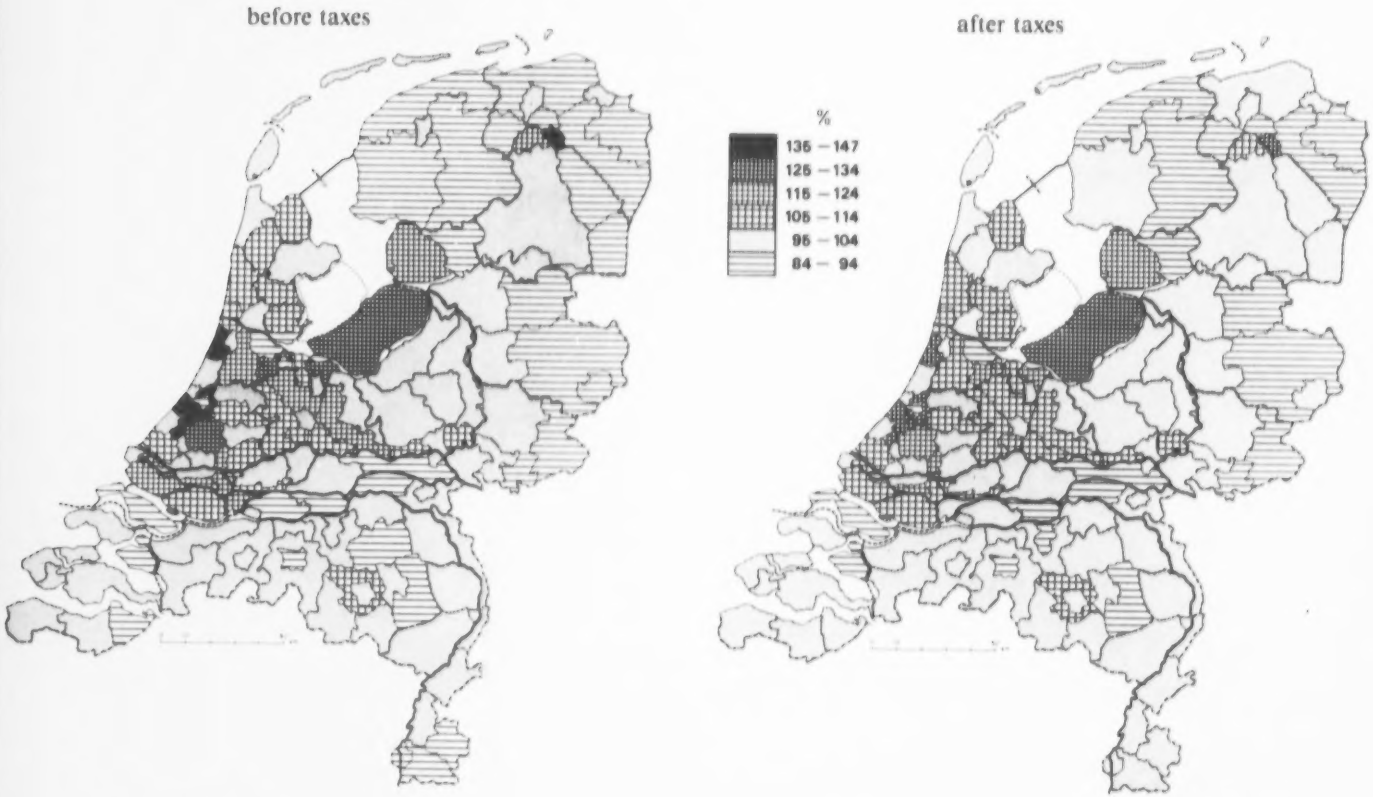
Basic source: Central Bureau of Statistics

92

Income per employed person before and after taxes, in % of the national average of such incomes before and after taxes, in 1974, by economic-geopgraphic region of residence.



Basic source: Central Bureau of Statistics

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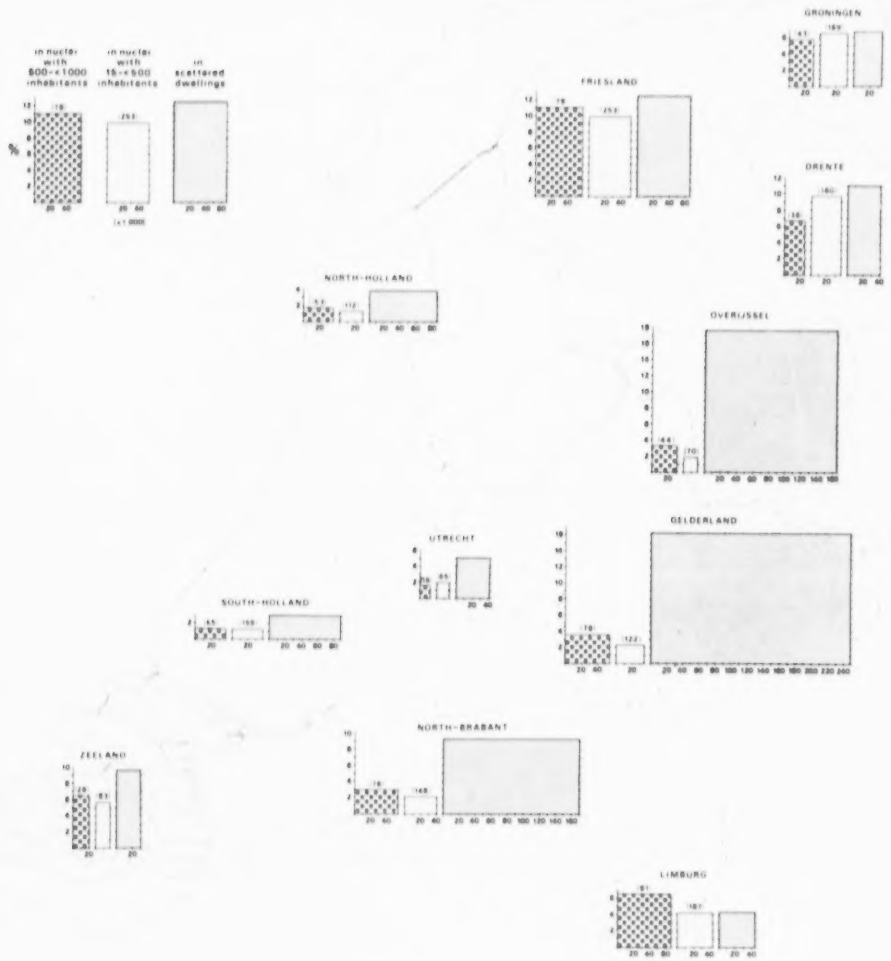
18. SMALL SETTLEMENTS

Provincial population living in: scattered dwellings, in nuclei with 15-< 500 inhabitants and in nuclei with 500-< 1000 inhabitants; in absolute numbers and in percentage of the total provincial population; as of 28 February, 1971 (Census).



Basic source: Central Bureau of Statistics (unpublished)

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19. ON THE DOLE

Payment Receivers (P.R.) under the Unfitness for Labour Acts (WAO/AAW) and the 'Registered Unemployed' (R.U.), both in % of the population aged 15-64 years, and their quotient, per ultimo 1978, by nodal (COROP) region.

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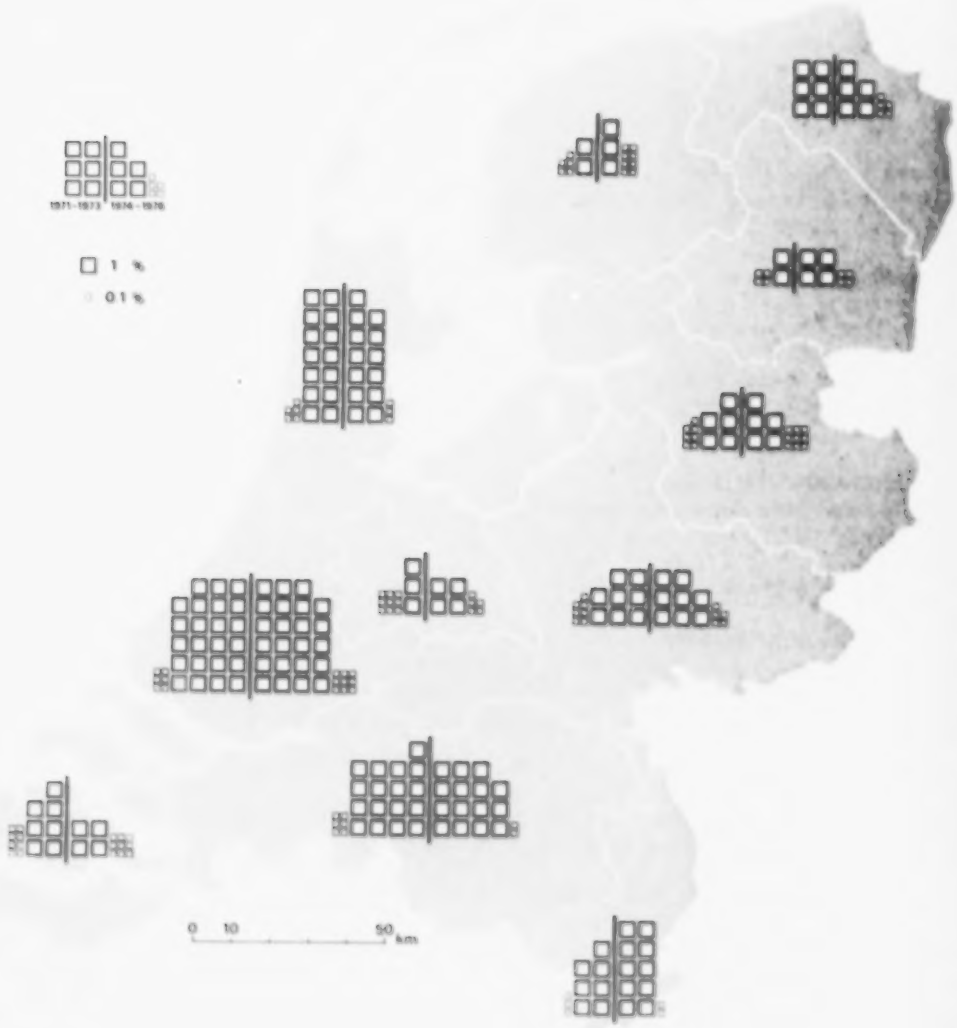
71 (1980) 6

Basic source: Central Bureau of Statistics

3695

20. INVESTMENTS

Percentage distribution over the provinces of the national total gross investments in fixed assets by (private) industry over the periods 1971-1973 (*f* 29,380 million) and 1974-1976 (*f* 35,140 million).



Basic source: Central Bureau of Statistics

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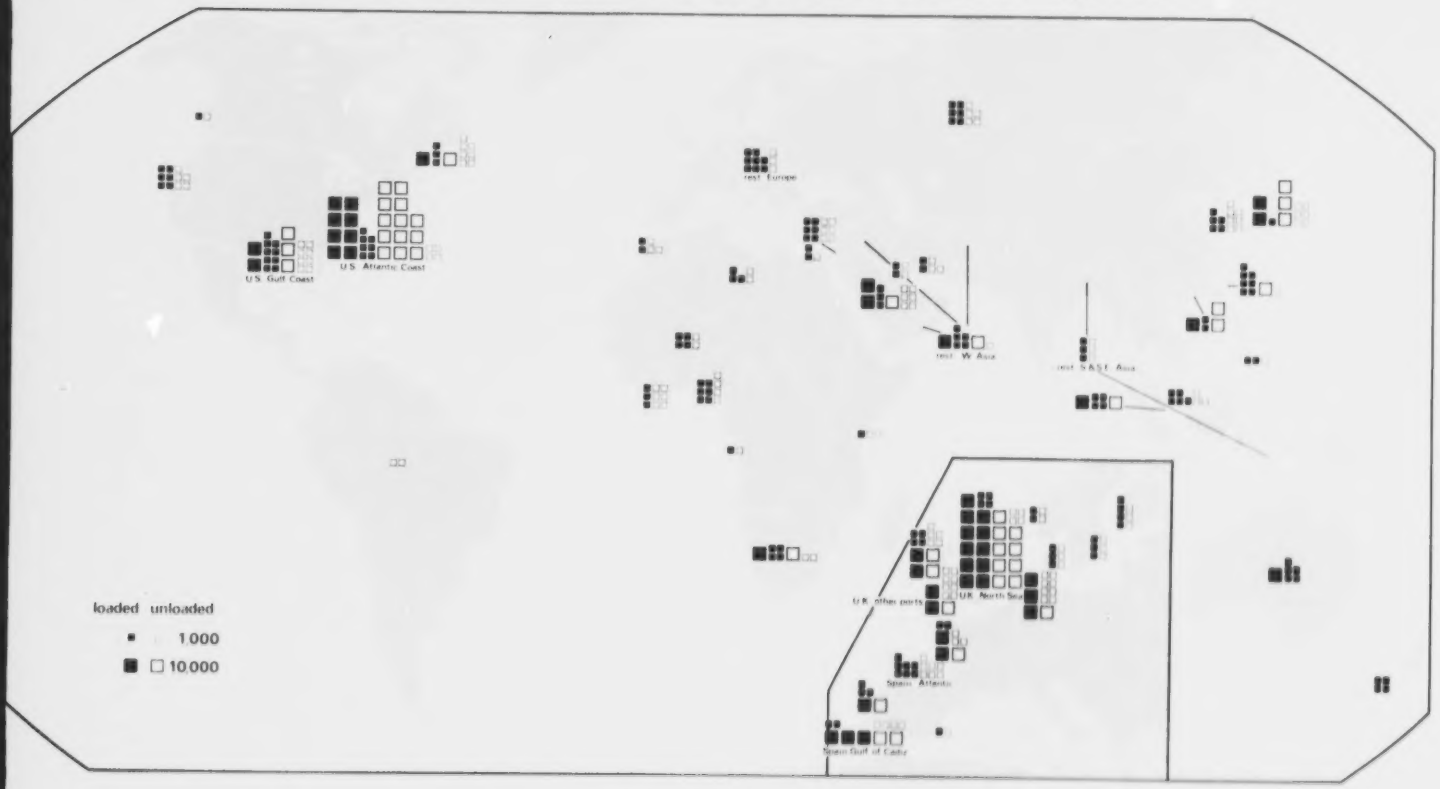
96

Sea-borne traffic of containers (of ≥ 20ft) in the Port of Rotterdam in 1979. Numbers (× 1,000) loaded and unloaded, with country or region of destination and origin, respectively.



Basic source: Rotterdam-Europoort-Delta 1980, no. 5

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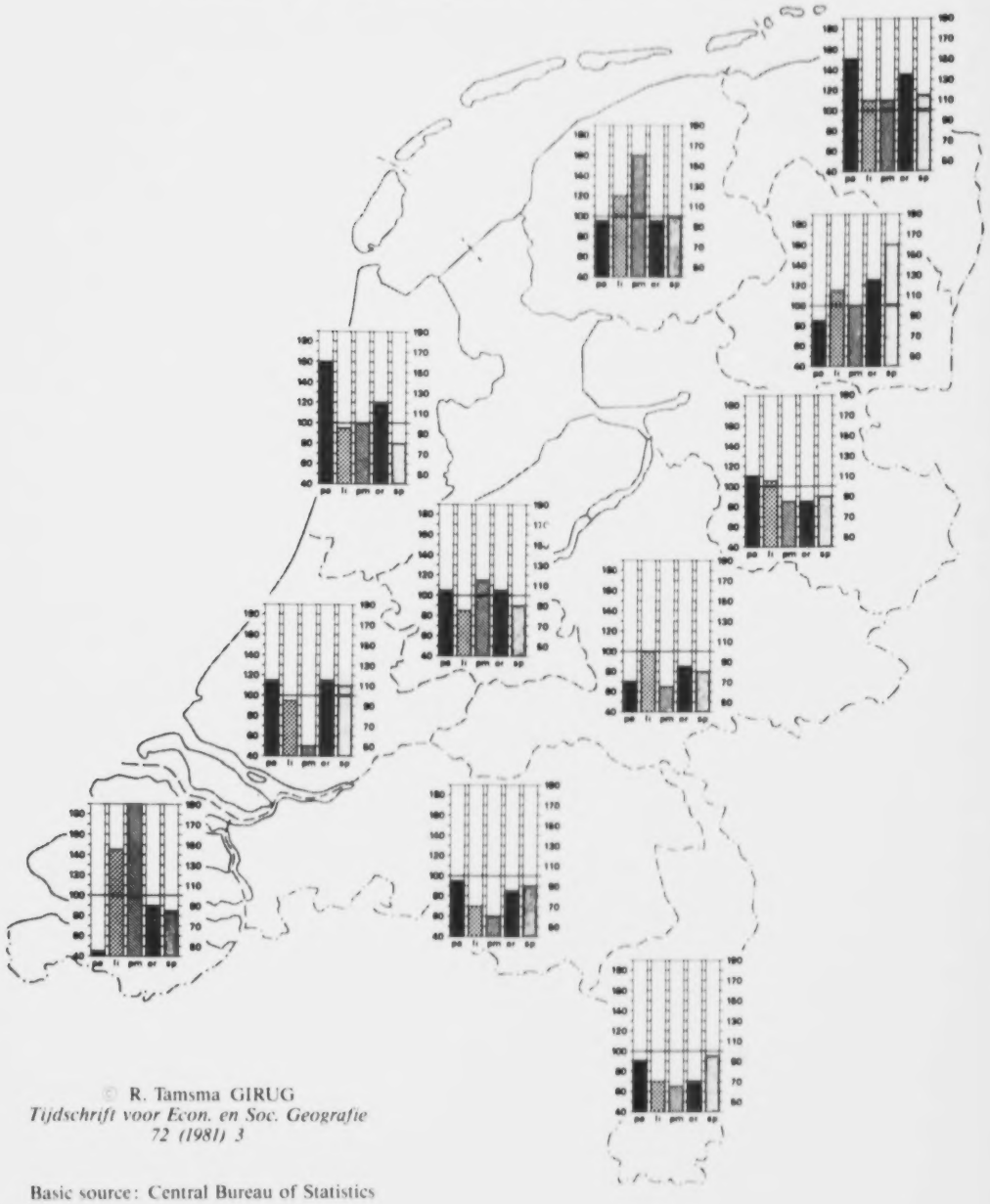
97

22. RECREATIONAL FACILITIES

Net expenditures by public authorities for performing arts (pa), libraries (li), preservation of monuments (pm), open air recreation (or) and sports (sp), per inhabitant in each province in 1975, in % of the average amount of all provinces for each of the items.



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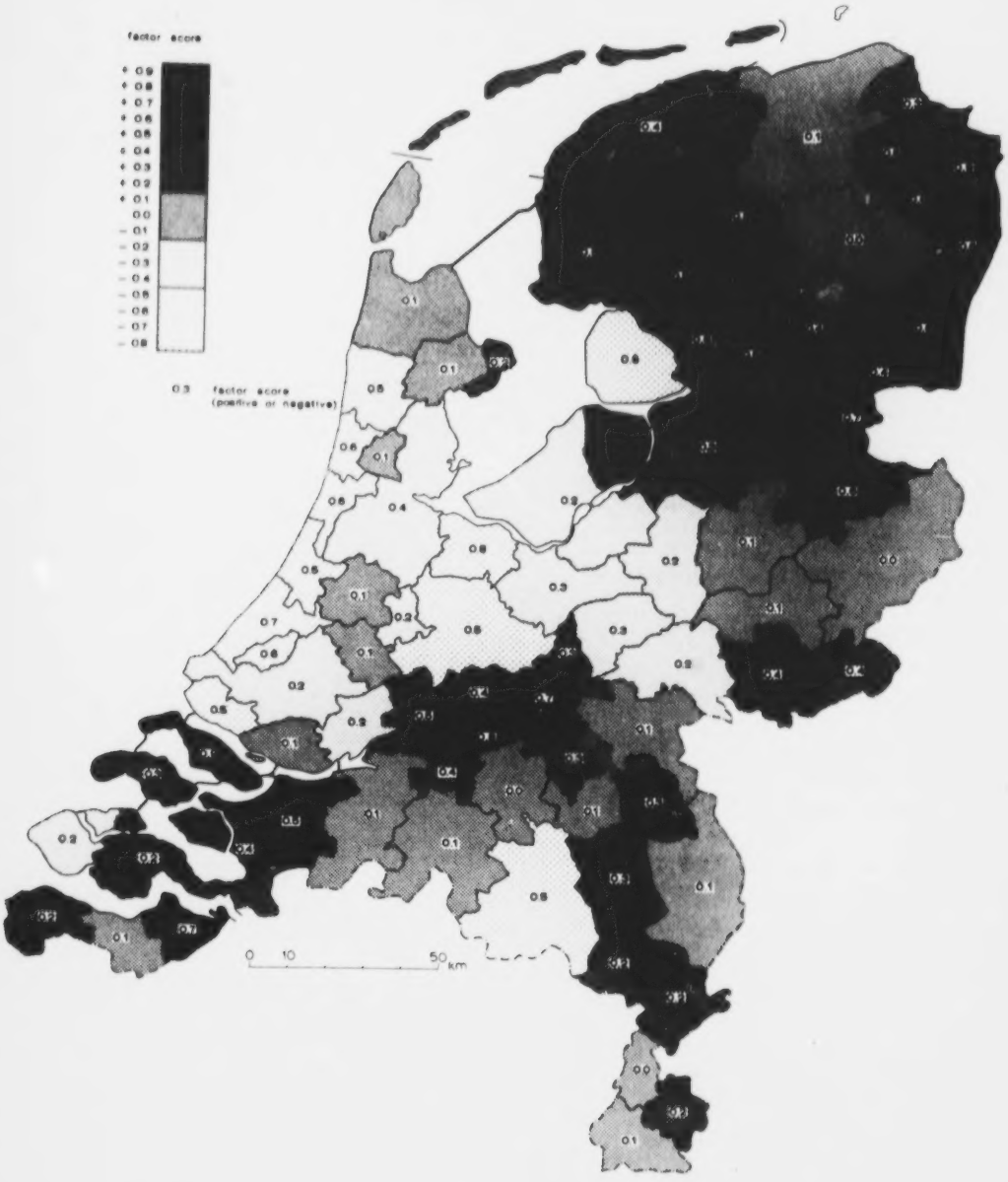
Basic source: Central Bureau of Statistics

* The absolute amounts are Dfl. 29.–, 18.–, 17.–, 46.– and 53.– respectively.

98

23. SOCIAL DEPRIVATION

Social deprivation* at the time of the 1971 Census, by nodal region.



Basic source: SCP-Cahier nr. 14, 1980

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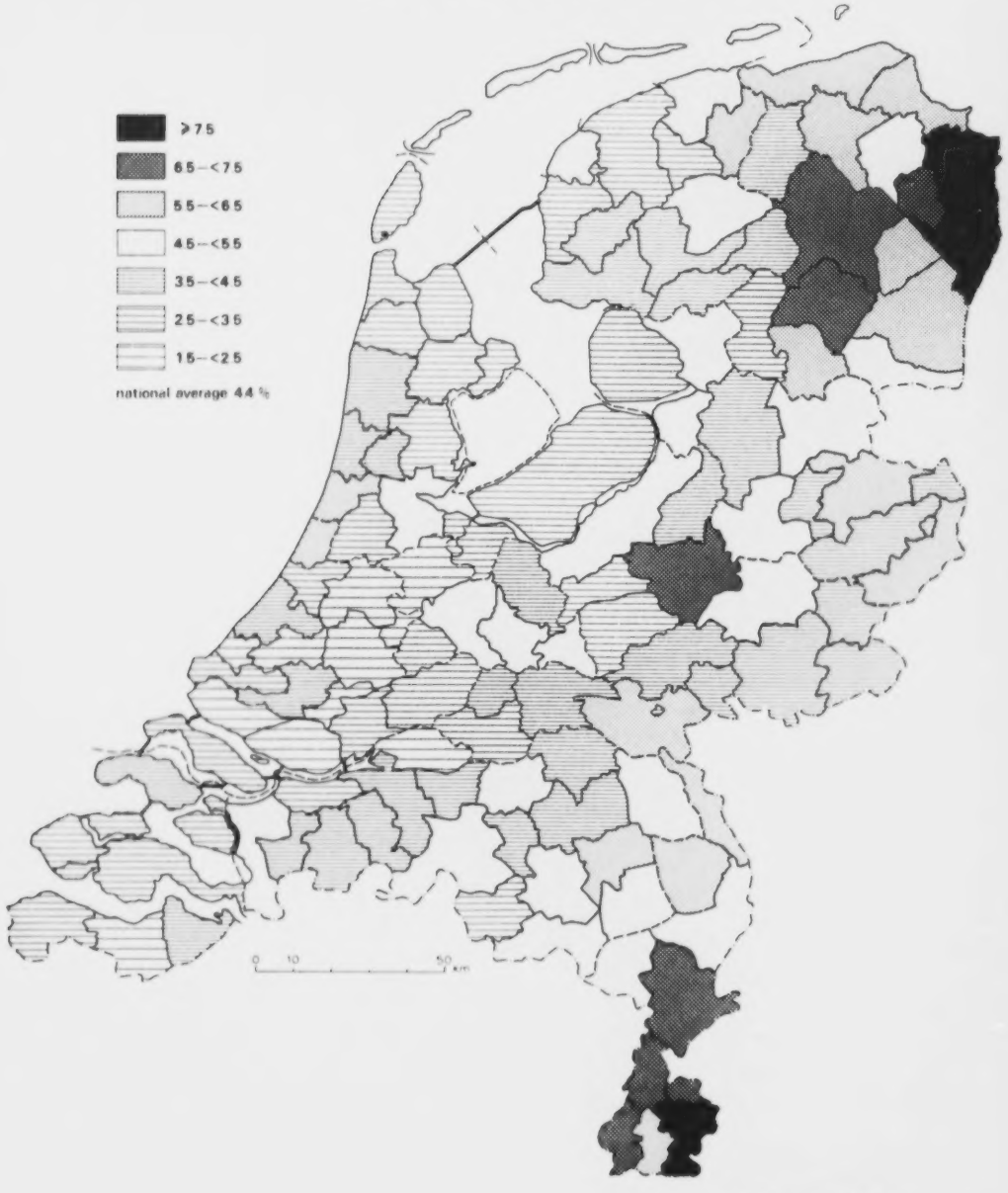
* Expressed as a factor score based on 11 variables (see adjacent text).

399

24. UNFIT FOR WORK

Males aged 25-49 who have been medically declared as 80-100% unfit for labour and consequently received benefits under the WAO- or AAW-Act in % of all males aged 25-49, in 1977, by Labour Exchange District.



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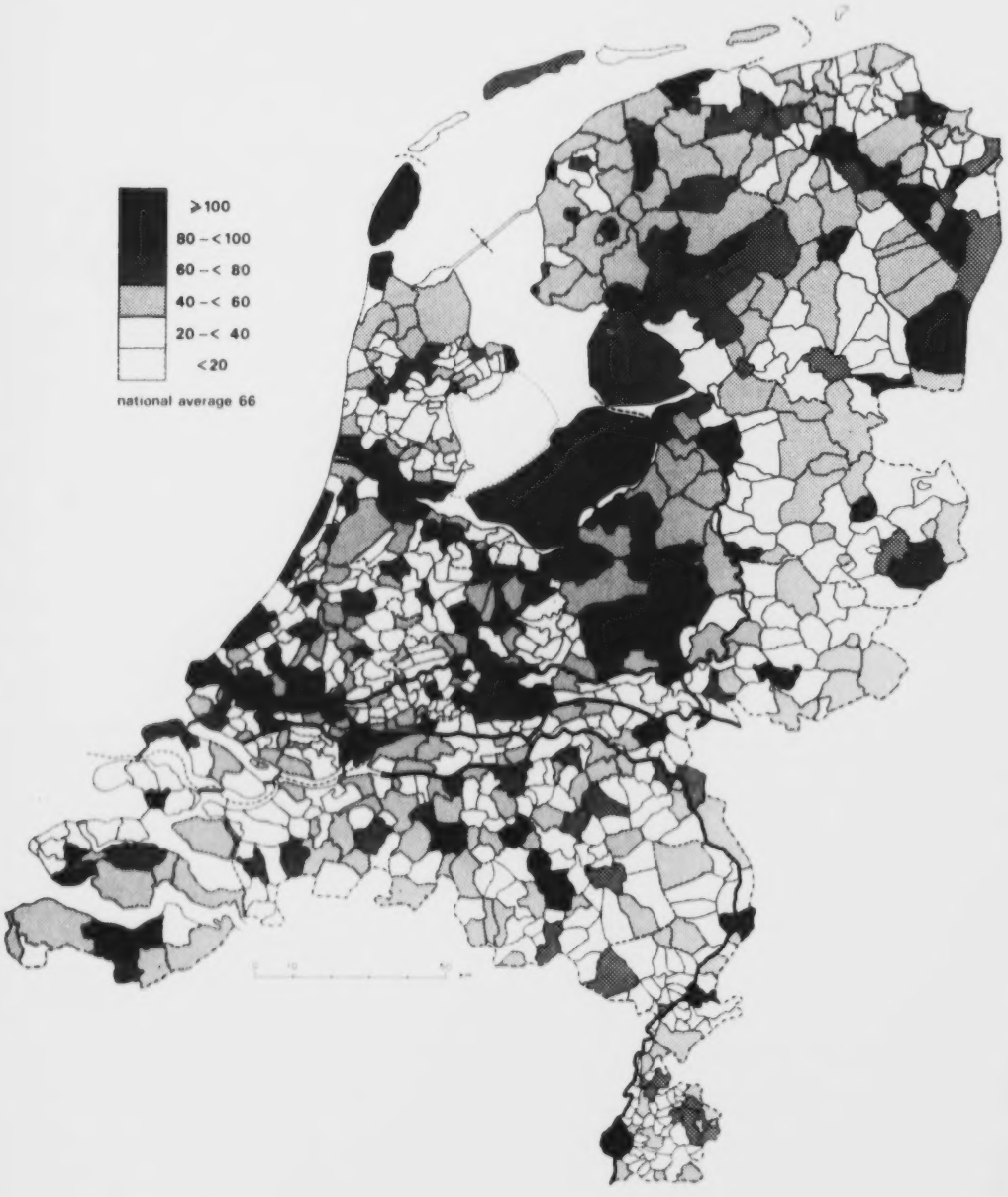
Basic source: Central Bureau of Statistics/Econ. Techn. Inst. Noord-Holland

100

25. RESIDENTIAL MOBILITY

Local residential mobility: number of persons who changed their address within their municipality of residence, per 1,000 inhabitants, in 1977.



Basic source: Central Bureau of Statistics

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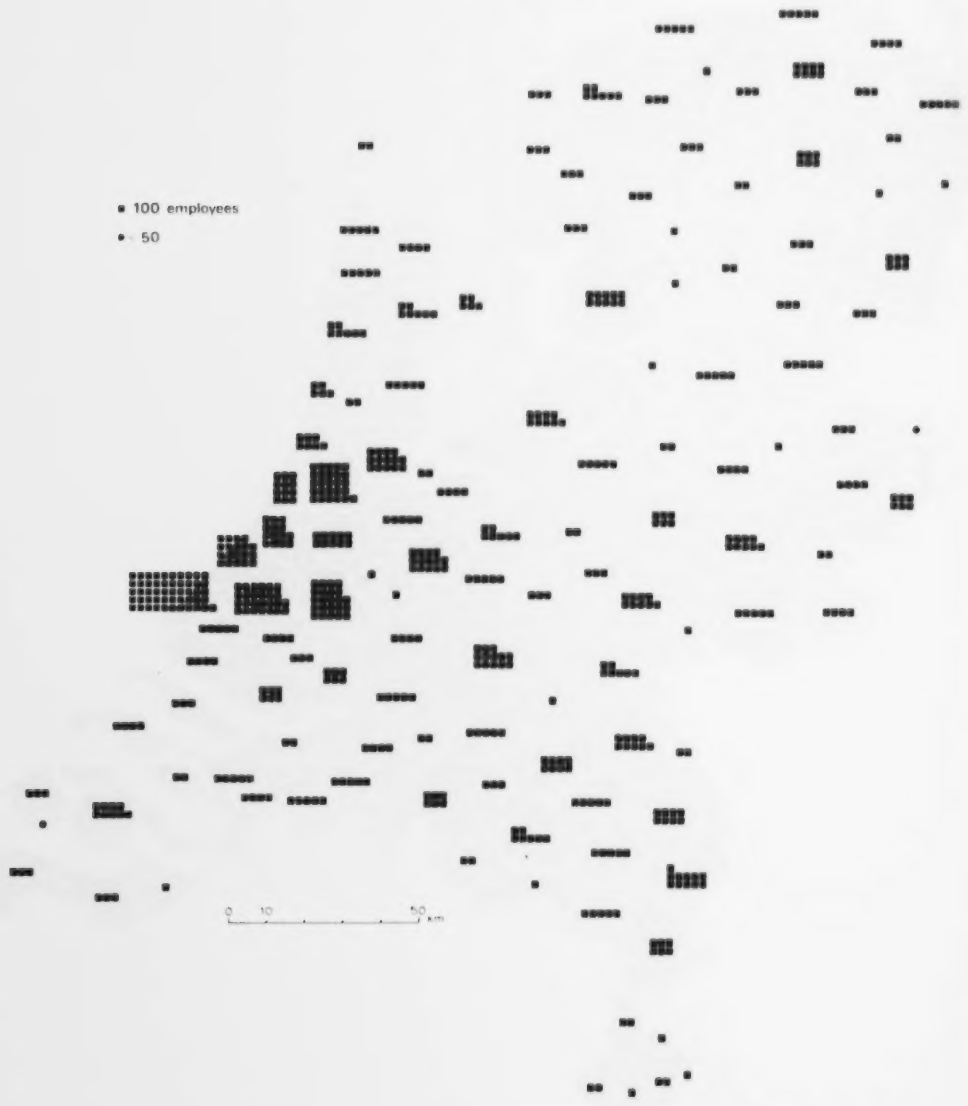
26. AGRICULTURE

Employment in agriculture (including forestry and fishing) as of 31 March 1978, by Labour Market District.



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Basic source: Central Bureau of Statistics

27. MEMBERS OF PARLIAMENT

Members of both Houses* of Parliament for the session-period 1981-1985, by municipality (and province) of residence, autumn 1981.

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* The 150 members of the (much more powerful) Second Chamber are directly elected via party lists by nationwide proportional representation. The 75 members of the First Chamber are indirectly elected, *viz*, by the (directly elected) members of the Provincial Councils.

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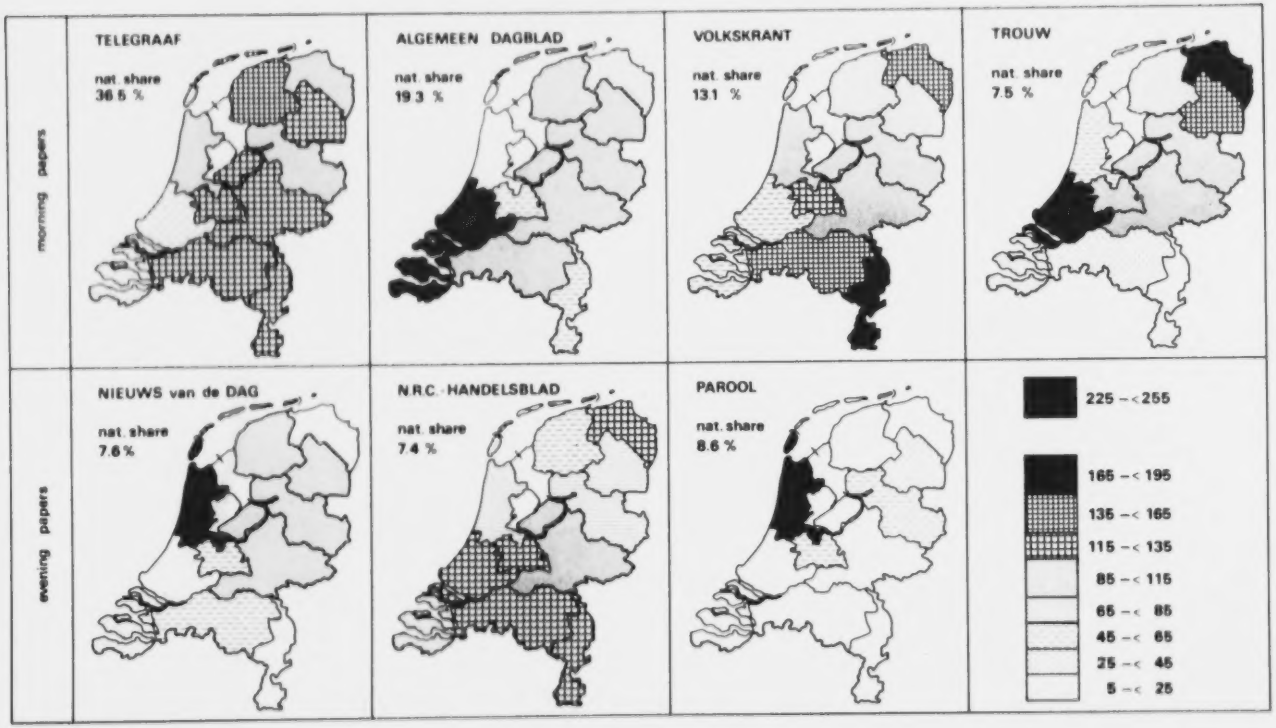
Provincial preference for the seven leading daily newspapers, February 1981.*
(Values in legend: percentage share of newspaper X of total circulation of all seven papers in province Y/Netherlands × 100).



Basic source: *De Journalist* (absolute values)

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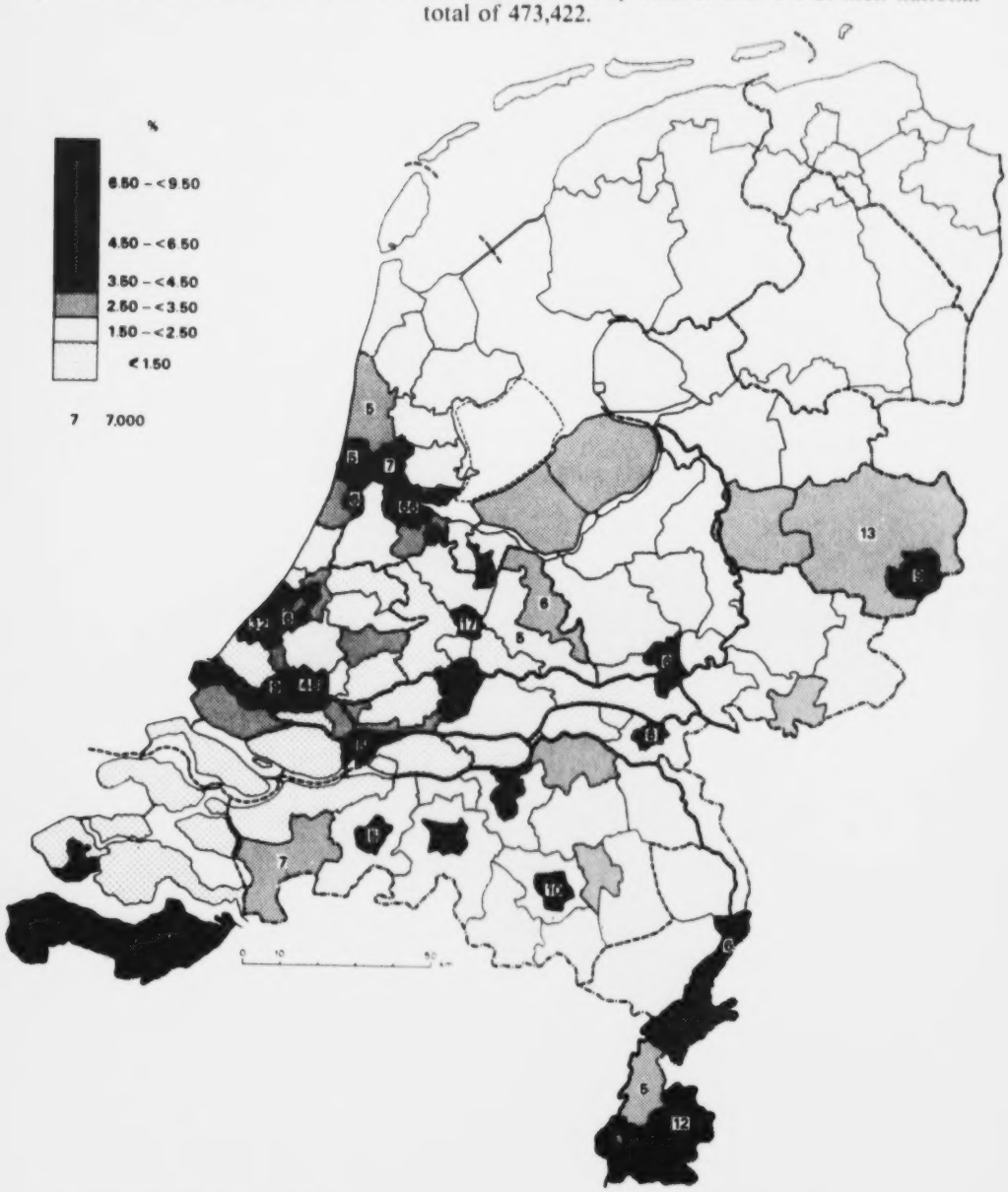
* Three minor newspapers, with together about 5% of the total circulation, are not included.

29. FOREIGN INHABITANTS

Inhabitants of non-Dutch nationality* on January 1, 1980, by economic-geographic region, as percentage of all inhabitants, and in thousands where they number over 1% of their national total of 473,422.



Basic source: Central Bureau of Statistics

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* Excluding about 200,000 people from Surinam and the Dutch Antilles who do have Dutch nationality.

30. MARITAL FERTILITY

Marital fertility, in % of the national average (= 100) in selected years, for the period 1850-1980, by province.

base line (na = 100)
selected years
continuously high mar. fert. (330-355 o/oo)
rapidly falling mar. fert. (from 340 to 200 o/oo)
mar. fert. from postwar high (225) to - 100 o/oo

Basic source: Central Bureau of Statistics

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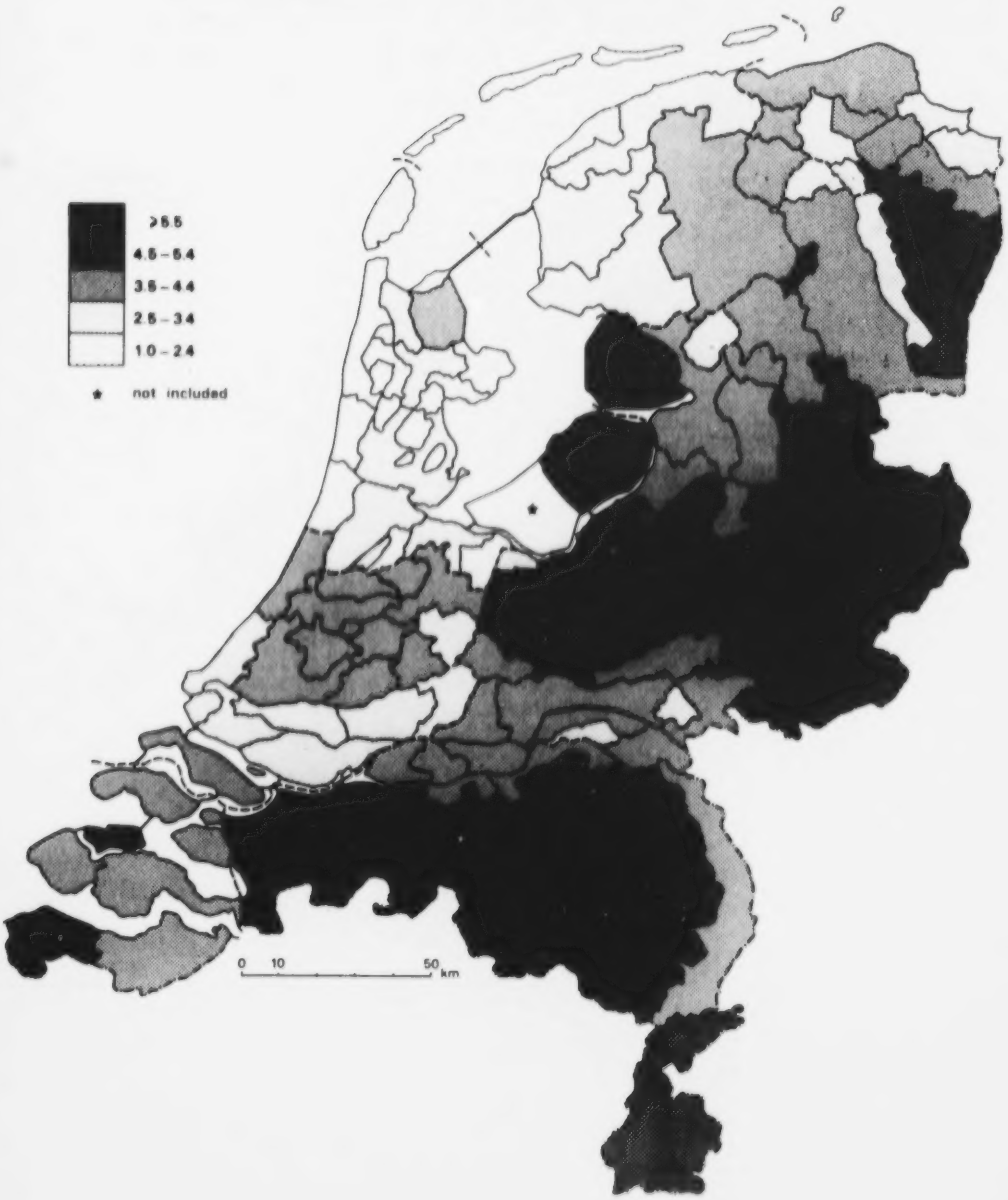
31. LIVESTOCK

Heads of cattle per hectare of grassland, in May 1979, by agricultural region.



Basic source: Central Bureau of Statistics

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32. PURCHASING POWER

Total of personal incomes after taxes per km² of land (× Dfl 1,000,000), in fiscal 1976, by nodal region

Basic source: Central Bureau of Statistics

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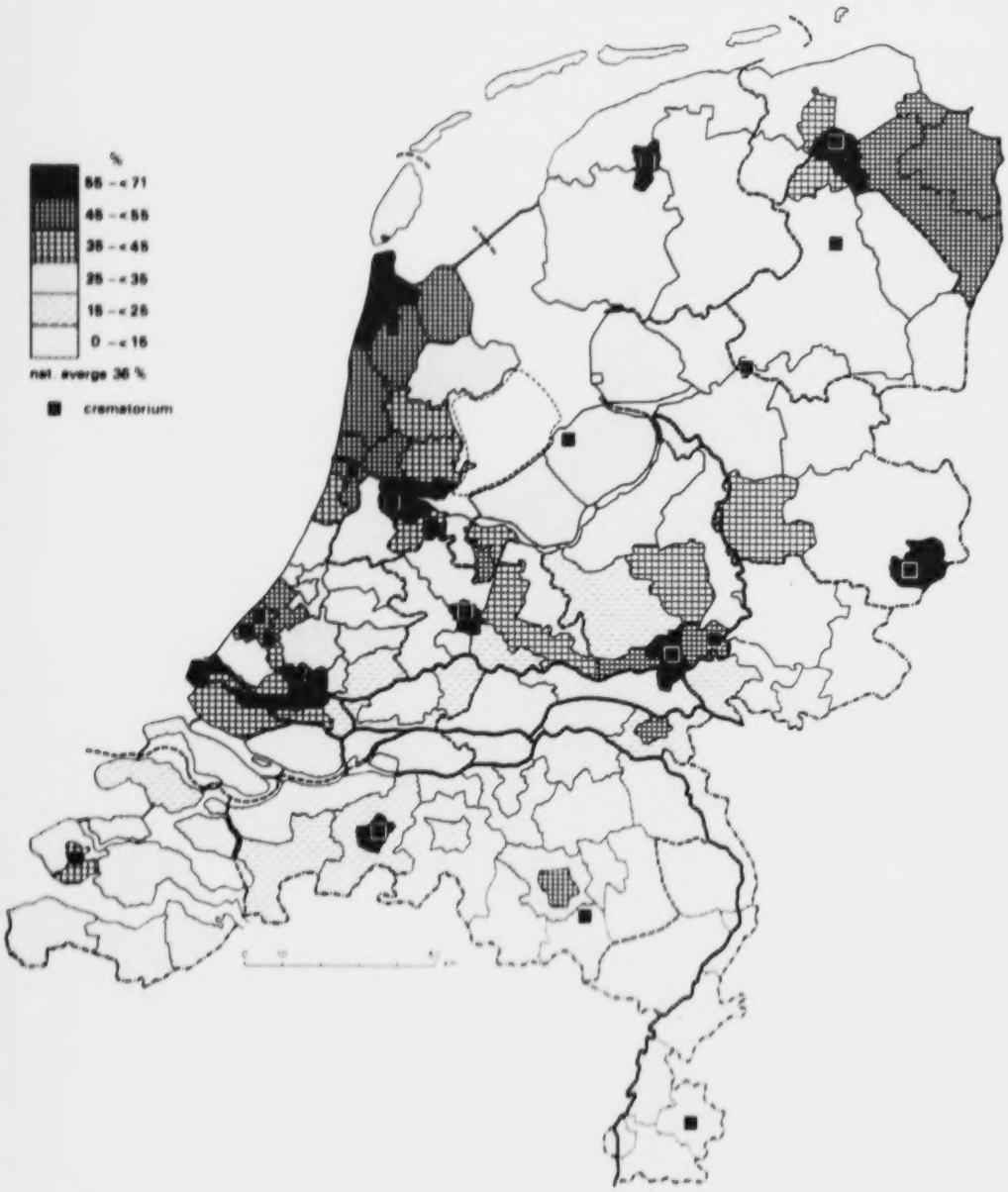
74 (1983) 1

33. CREMATIONS

Cremations in percentage of all deceased, and the location of all crematoria, in 1981, by geographical region.



Basic source: Assoc. for Cremation AVVI.

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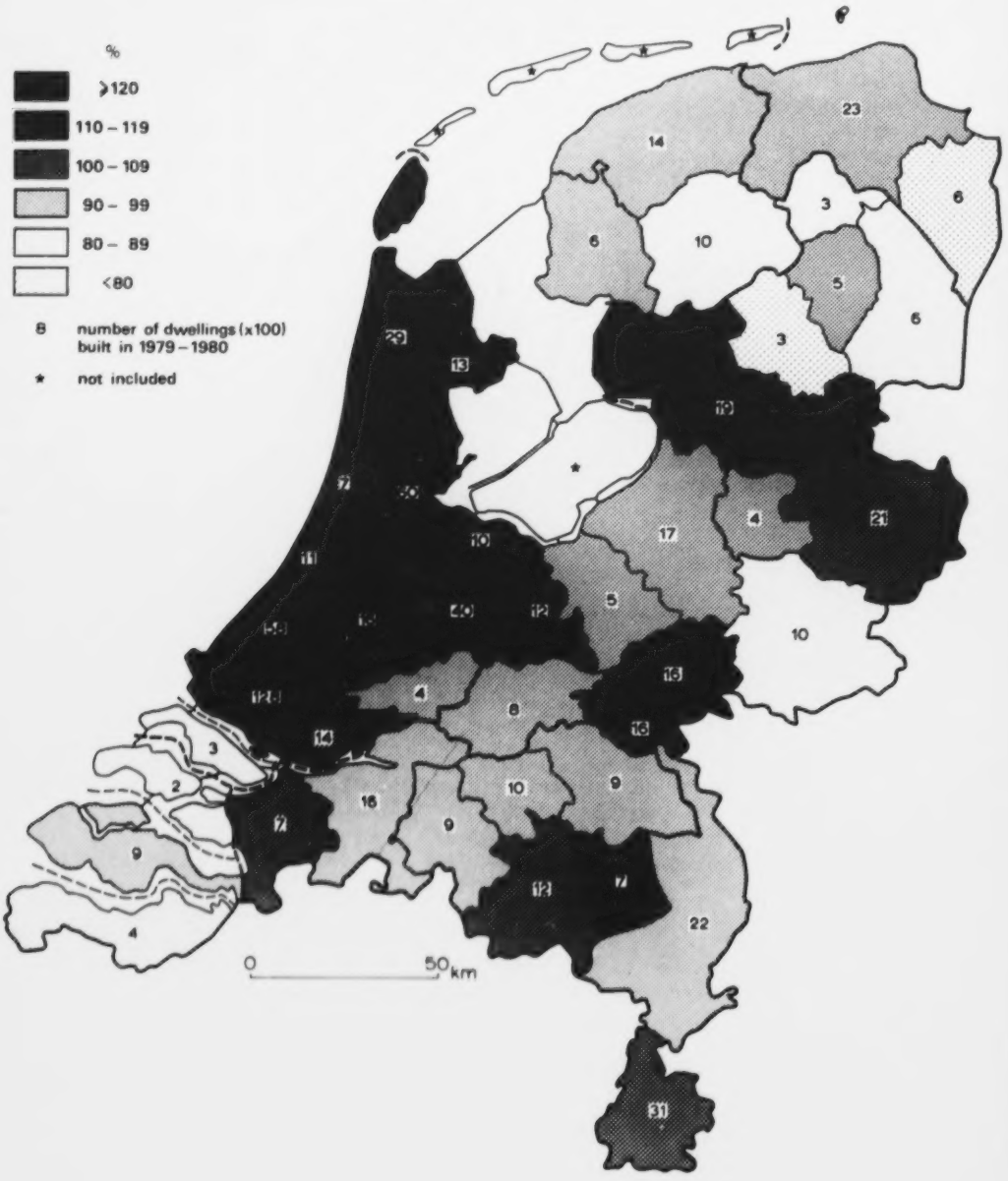
2049

34. LAND VALUE

Costs of land for fully subsidised dwellings, per housing market region, averaged over the percentual deviations from the national mean in each of the 4 semesters in 1979-1980.



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Basic source: Parliamentary Paper 17100, nr. 22, 29.1.1982

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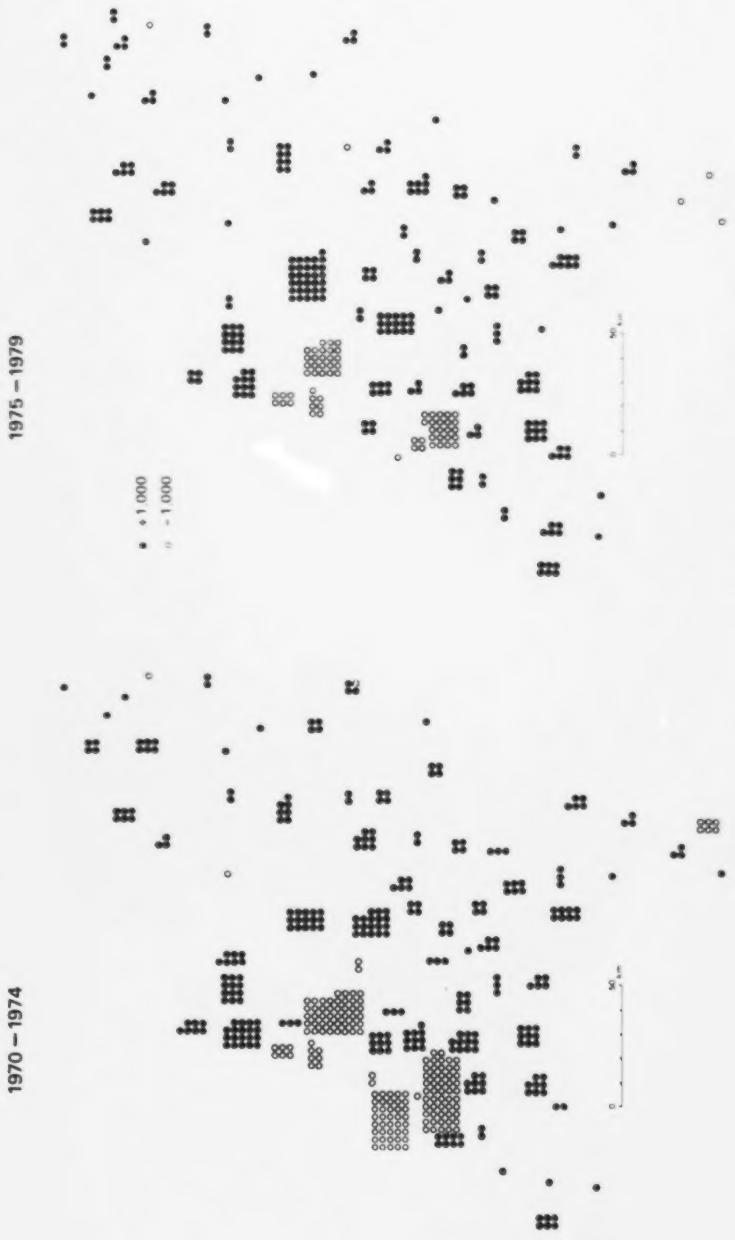
35. MIGRATION

Migration balances over the periods 1970-1974 and 1975-1979, in thousands, by nodal region.



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Basic source: Central Bureau of Statistics

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36. WATER POLLUTION

Drainage of polluted water from households and other sources (industries etc.) in 1980, in relation to the purifying capacity of all sewage disposal plants at 1.1.1980 and as planned for 1.1.1985 (both quantities × 10,000 inhabitant-equivalents), by (joint) control region.

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Basic source: Indicatief Meerjarenprogramma Water 1980-1984 (Staatsuitg. 1980)

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37. EMPLOYMENT

Distribution of all employees in mining + manufacturing + public utilities, per thousand of the national total (viz. 1,102,600*), at 31.III.1980, by Labour Exchange District in which they are employed.

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Basic source: Central Bureau of Statistics

* Of which 1% is employed in mining, 95% in manufacturing and 4% in public utilities.

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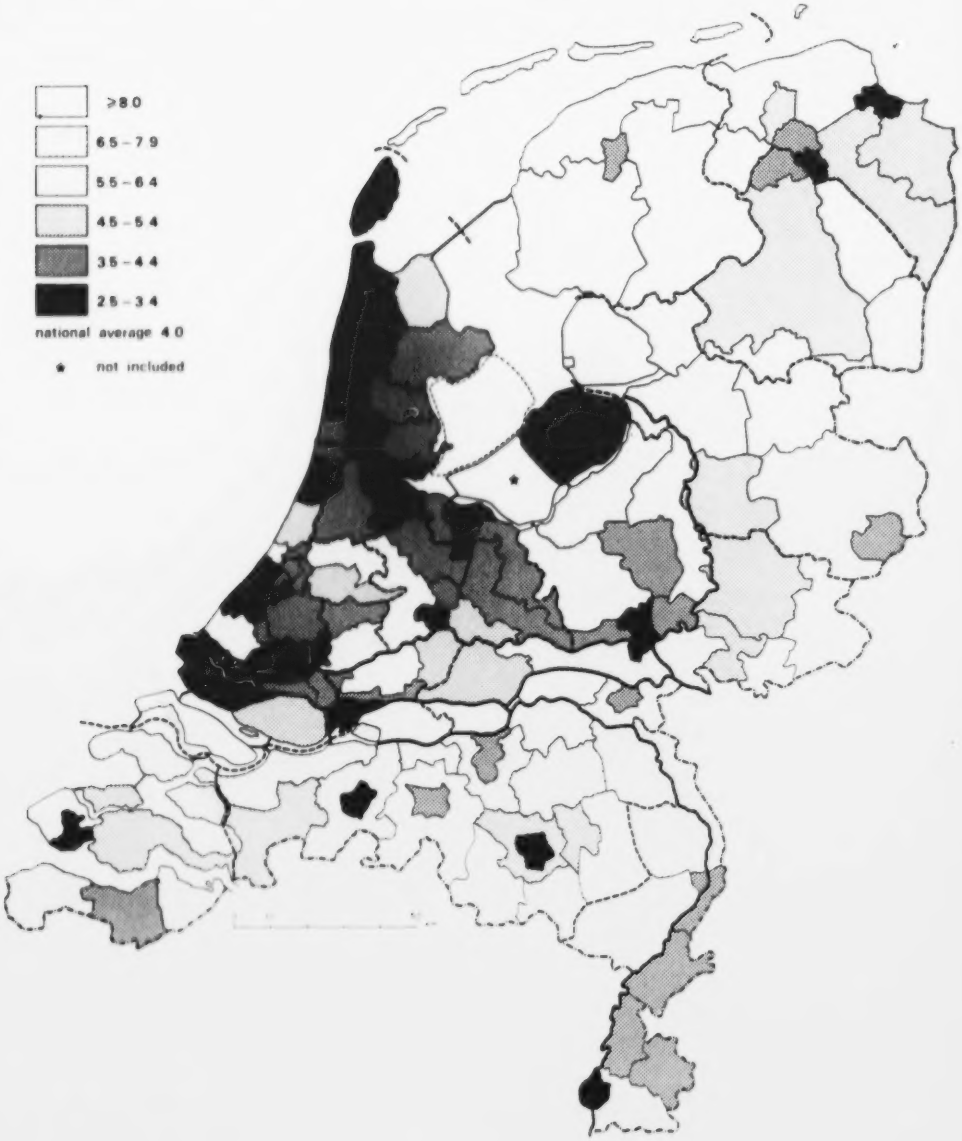
38. DIVORCES

Marriages/divorces ratio, 1976-1980. Quotient of the annual average number of marrying and of divorcing people, both per 1,000 inhabitants during 1976-1980, by economic geographical region.



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Basic source: Central Bureau of Statistics

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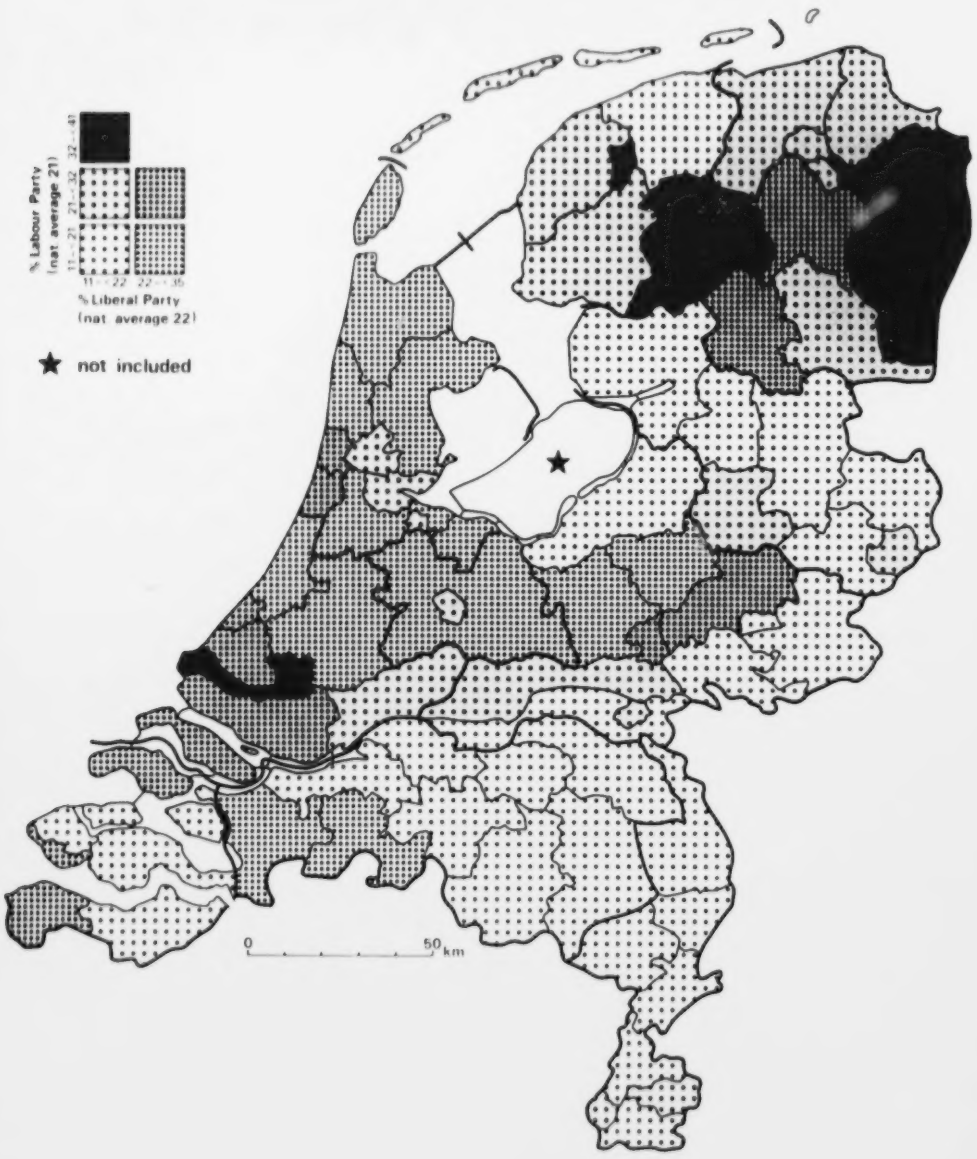
39. VOTING

Percentage of votes cast for the Labour Party and the Liberal Party at the election for the provincial parliaments at 24.III.1982, by polling district.



Basic source: Central Bureau of Statistics

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75 (1984) 3

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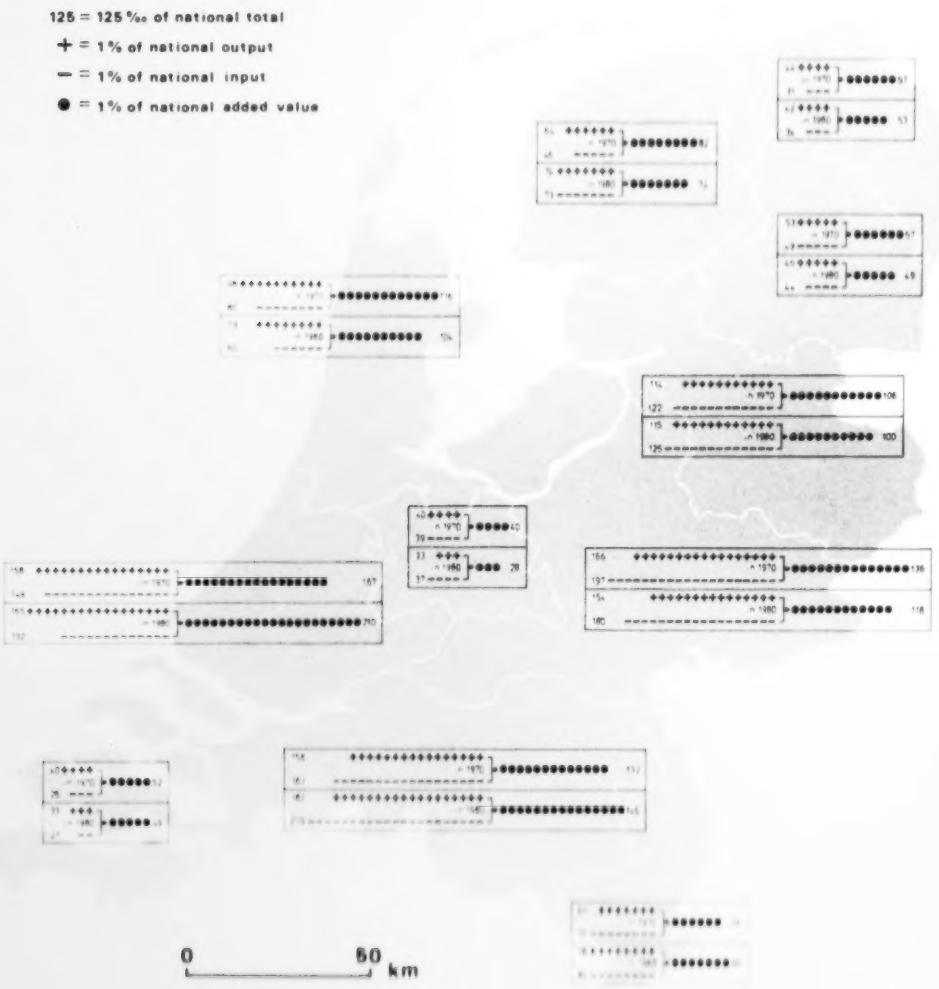
40. AGRICULTURE

Provincial shares (in % and ‰) of the national value of output, input, and resulting added value in the agricultural sector (incl. forestry and fisheries), in 1970 and 1980.



Basic source: Central Bureau of Statistics

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41. PHILIPS

Number of people working in all Dutch plants of the Philips Company* in 1982, by municipality.

Basic source: Central Bureau of Statistics

* Philips is by far the largest private employer in the Netherlands, and even the largest non-American employer in the world, only surpassed by General Motors, Ford, General Electric and IBM in 1982 when Philips' payroll included 348,000 people, of which 73,000 in the Netherlands (and 33,000 in the headquarters of Eindhoven alone).

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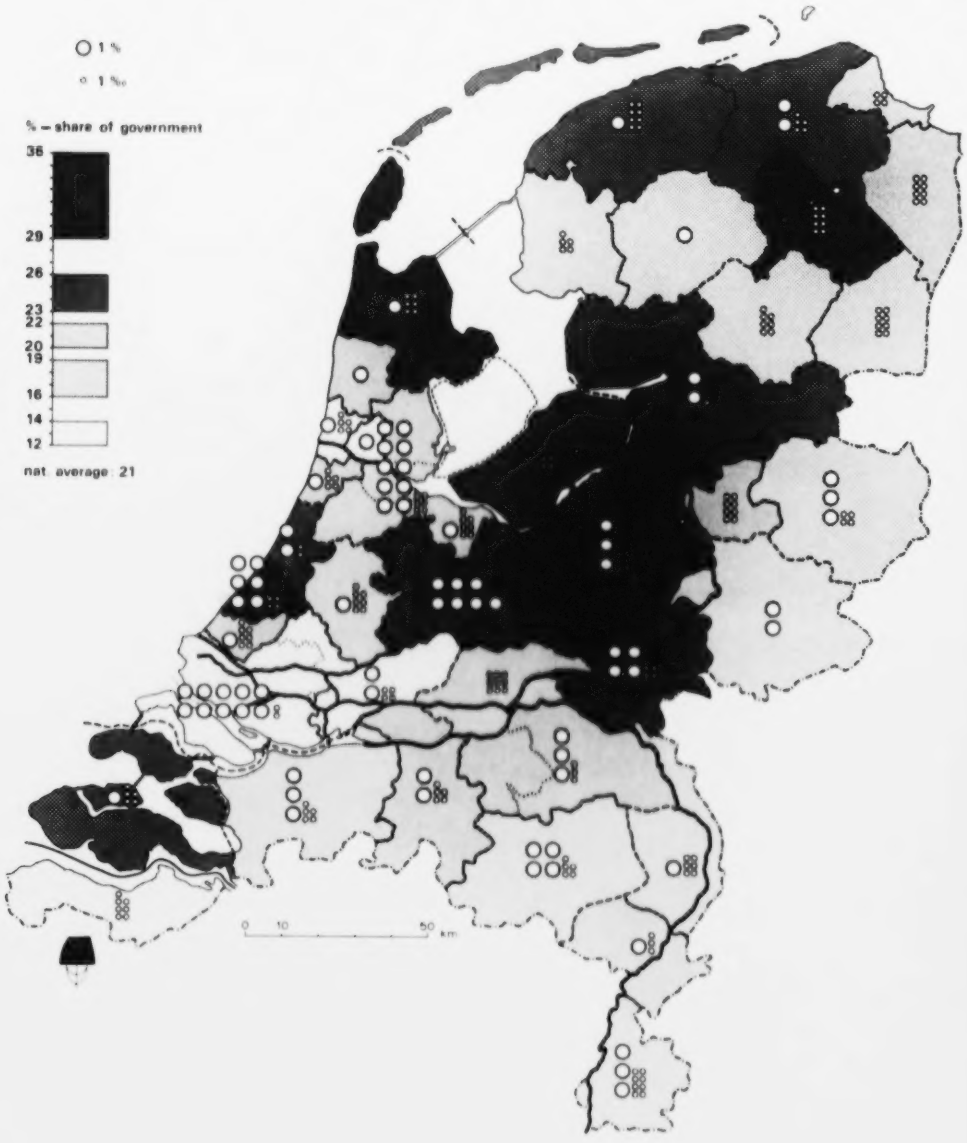
42. WAGES

Regional per thousand share in national total of wages* paid to employees (Dfl. 151,465 million), and the %-share of government wages in each region's wage total, in 1980.



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Basic source: Central Bureau of Statistics

* excl. premiums for insurance etc. paid by employer.

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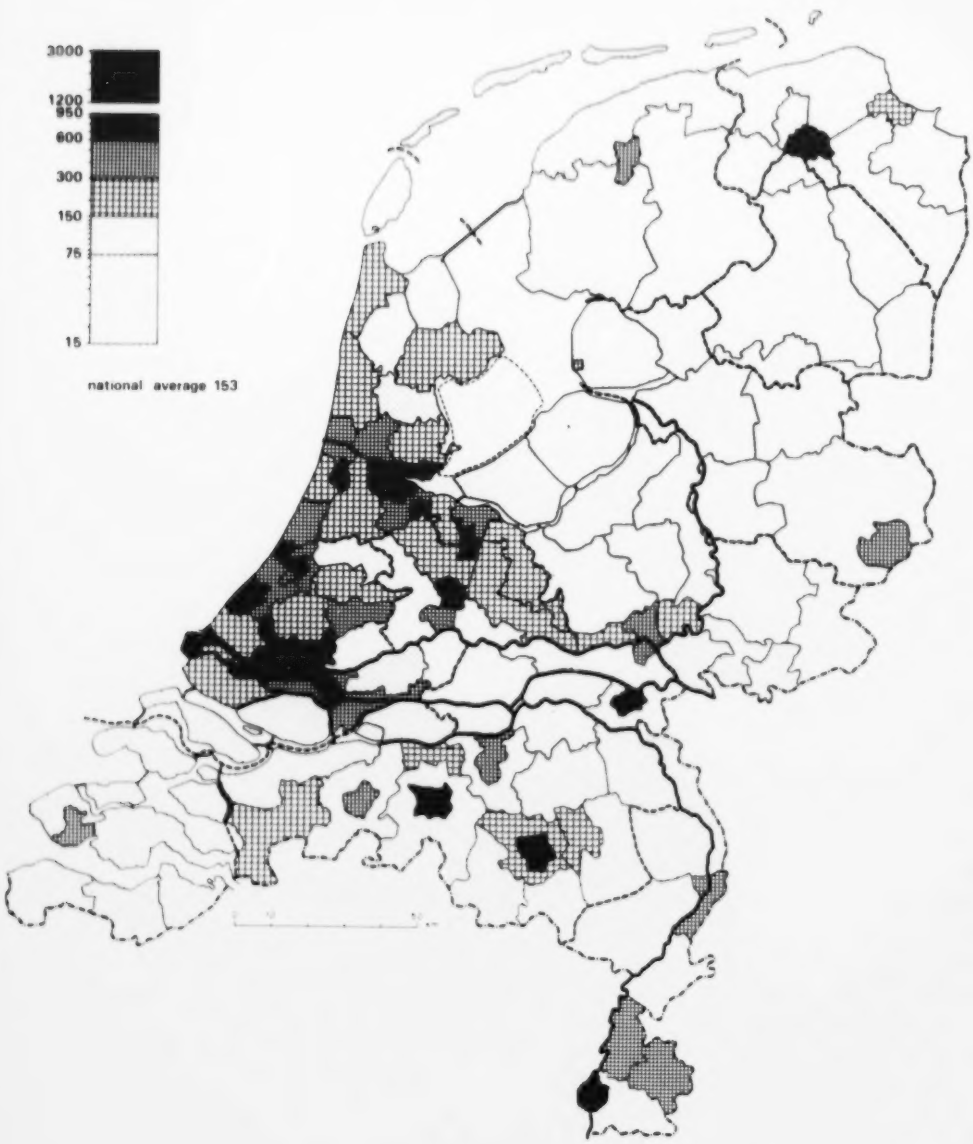
43. HOUSING

Dwelling units per km² of land, at 1.1.1984, by econ.-geographical region.



Basic source: Central Bureau of Statistics

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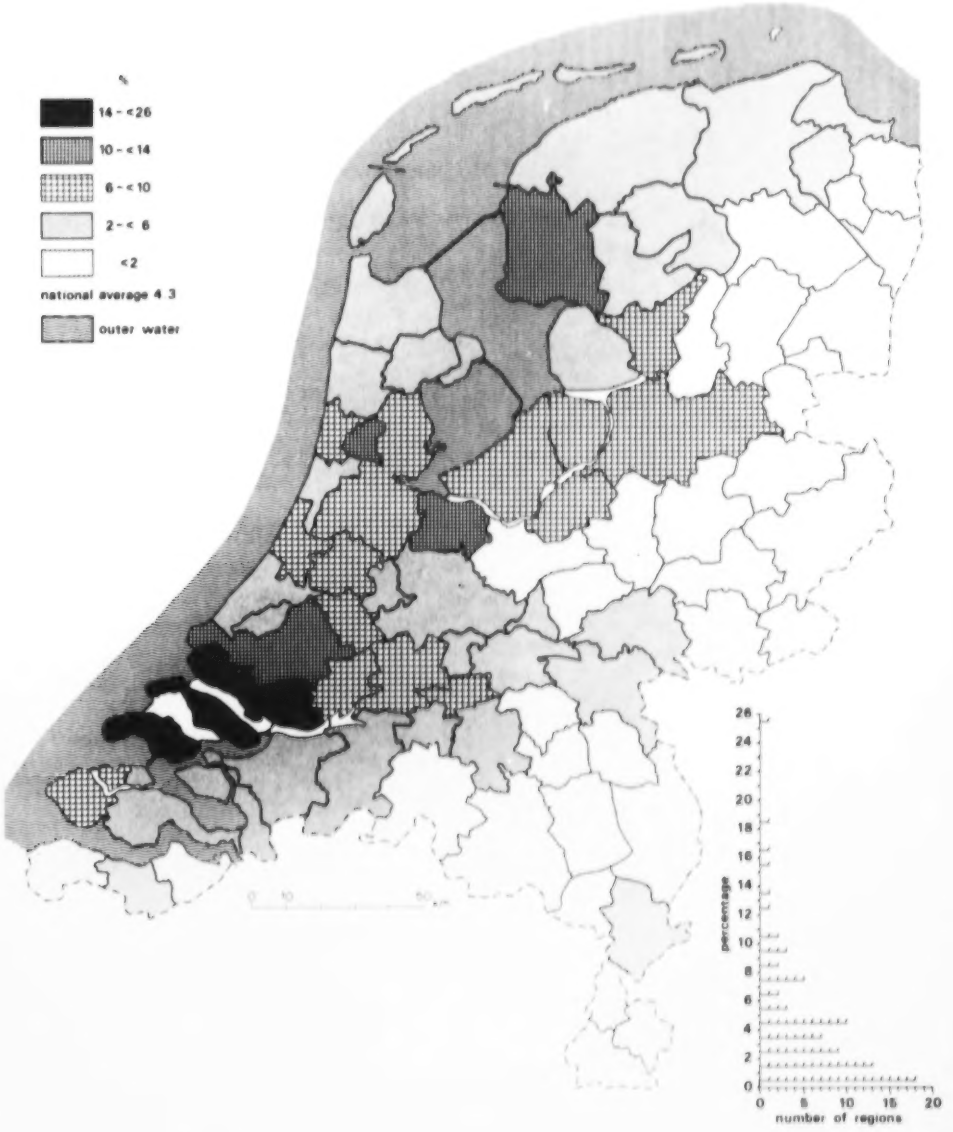
44. WATER SURFACE

Extent of inland water surface (i.e. all waterways of > 6 m in width and water bodies of ≥ 2 ha), as percentage of the total area (excl. 'outer water' +), at 1.1.1983, by nodal region.



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Basic source: Central Bureau of Statistics

\+ 'out water' = all tidal water plus IJssel Lake.

45. EMPLOYMENT

Promille distribution of population, of all employment in manufacturing & mining, and of employment in the four nationally largest classes of manufacturing (i.e., food & beverages; chemicals, incl. synthetic yarns & fibres; machinery; electrotechnical products; together comprising 51.0% of the national employment in manufacturing & mining), by province, at 30.IX.1984.

Basic source: Central Bureau of Statistics

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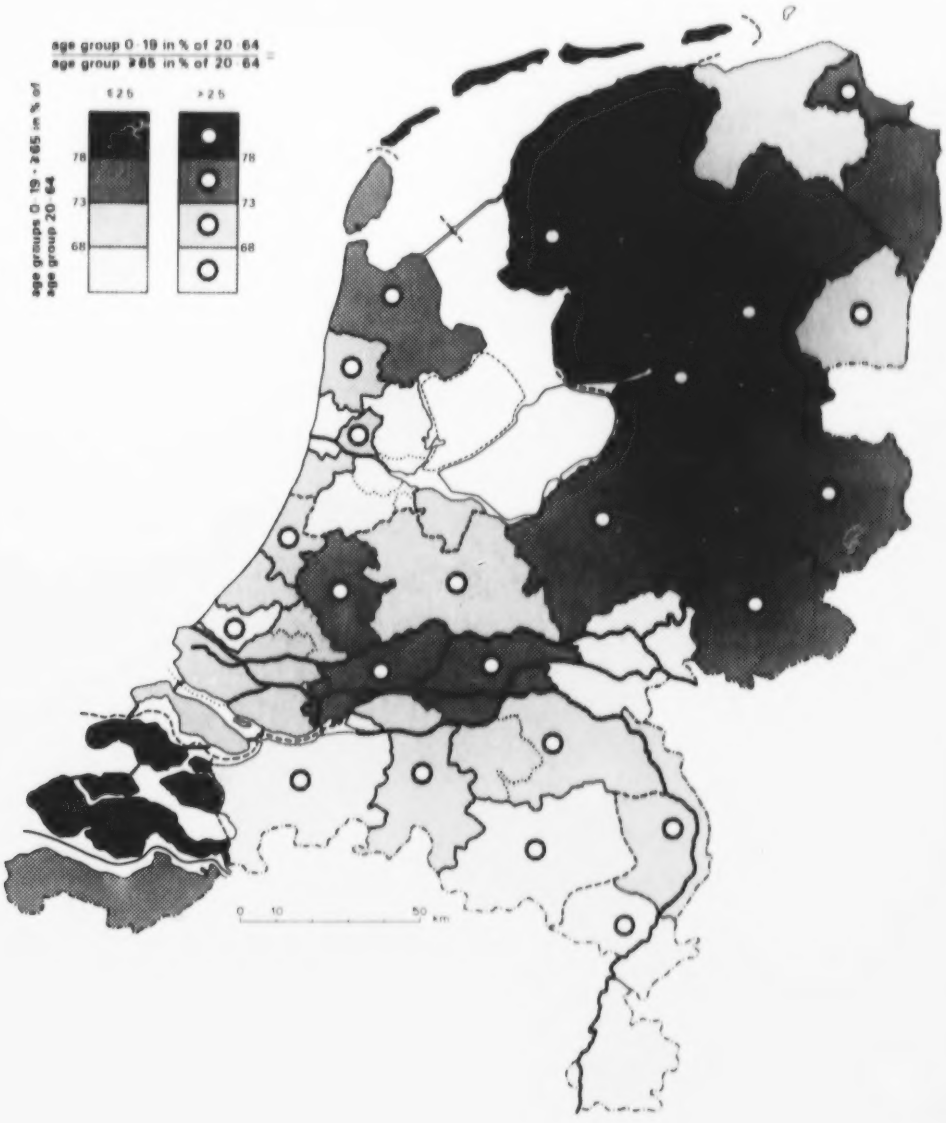
46. DEMOGRAPHY

Population aged 0-19 and ≥ 65, in % of population aged 20-64 (= 'demographic load'), with additional indication where % of 0-19 : % of ≥ 65 is higher than the national average of (50.6 : 20.1 = 2.5), by planning region, at 1.1.1983.



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Basic source: Central Bureau of Statistics

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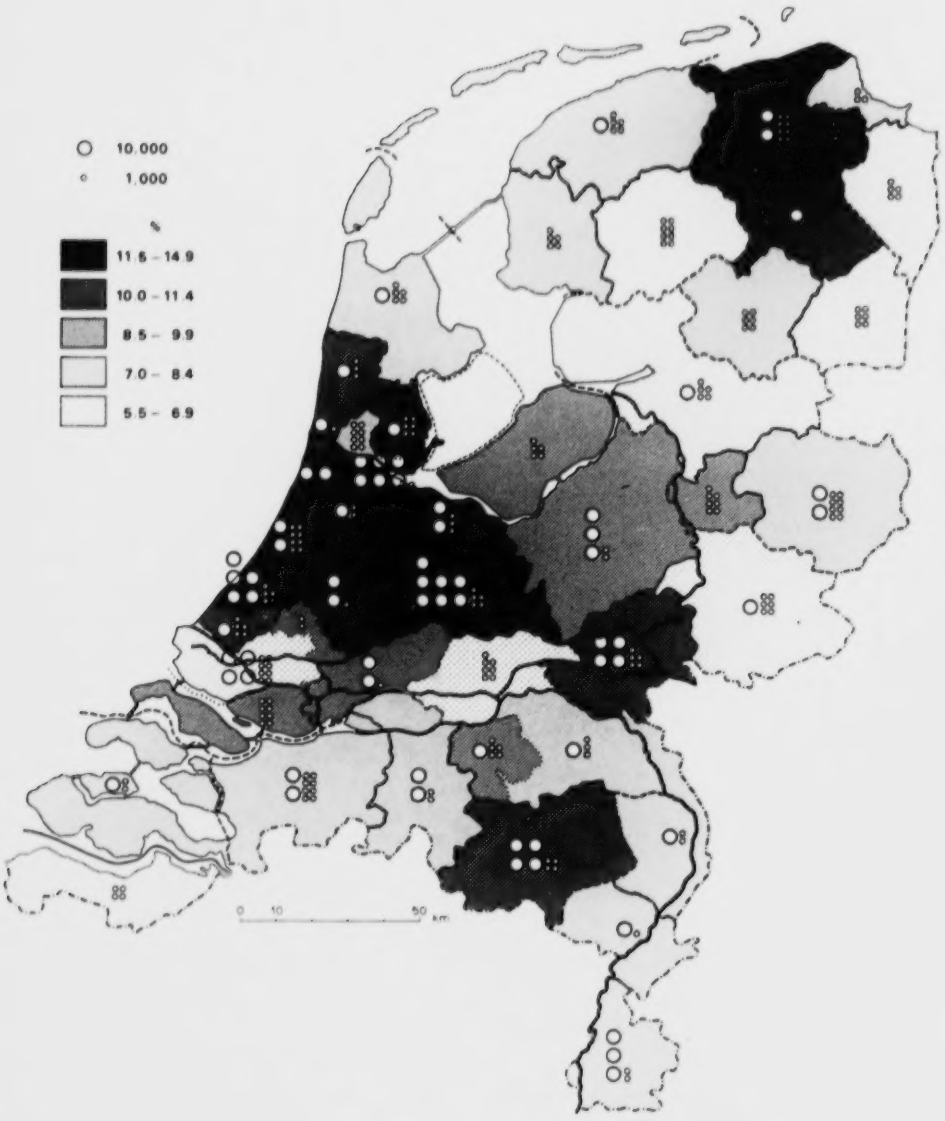
47. EDUCATION

Inhabitants having completed the third (= highest) level of education, in absolute numbers and in percentage of the total residential population, in 1981, by planning region.



Basic source: Central Bureau of Statistics

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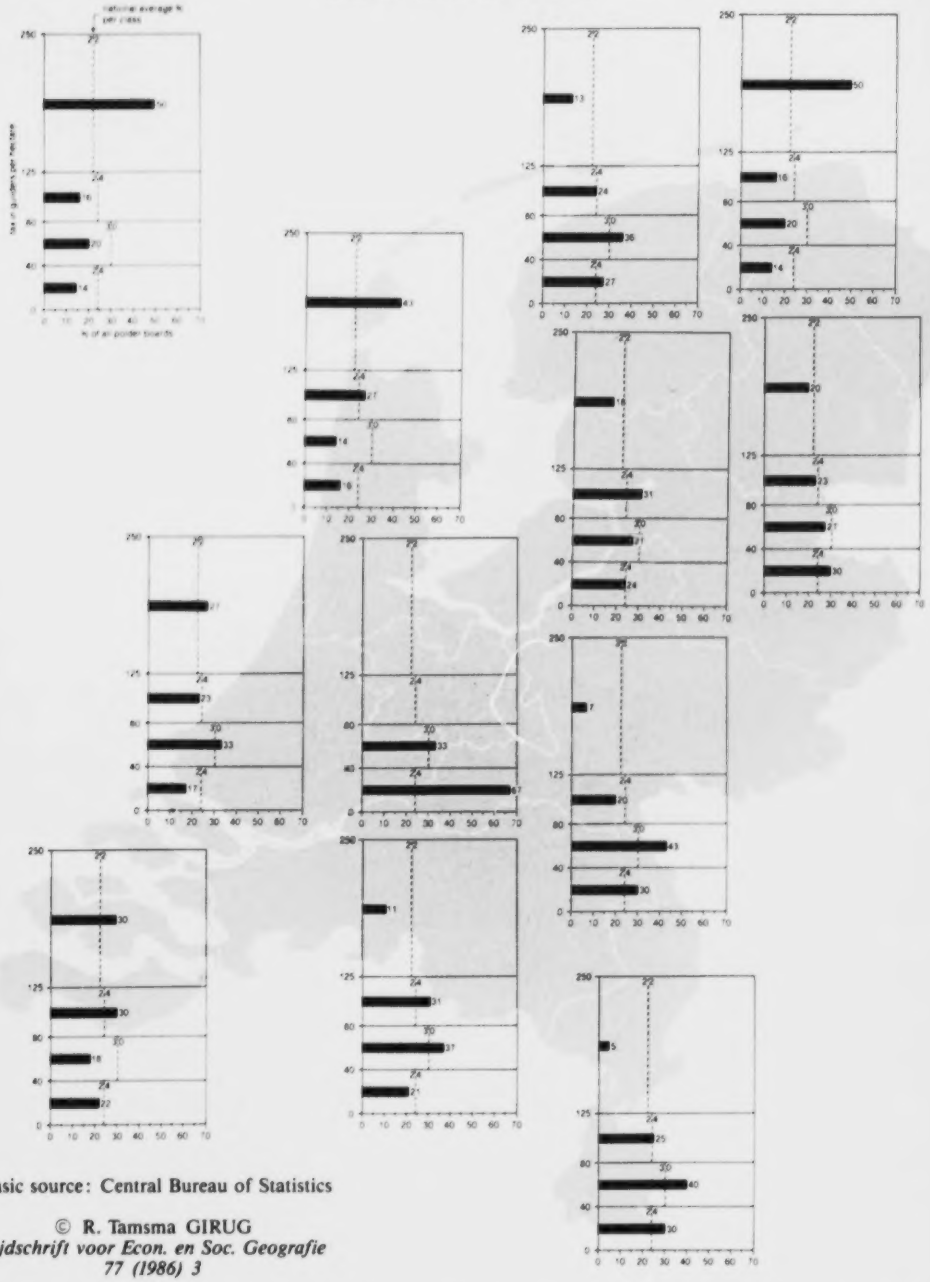
48. POLDER BOARDS

Percentage distribution of all polder boards (or parts thereof) within * each province over four classes of tax (in guilders per hectare) levied by these boards, in comparison with the national average per class, in 1984.



Basic source: Central Bureau of Statistics

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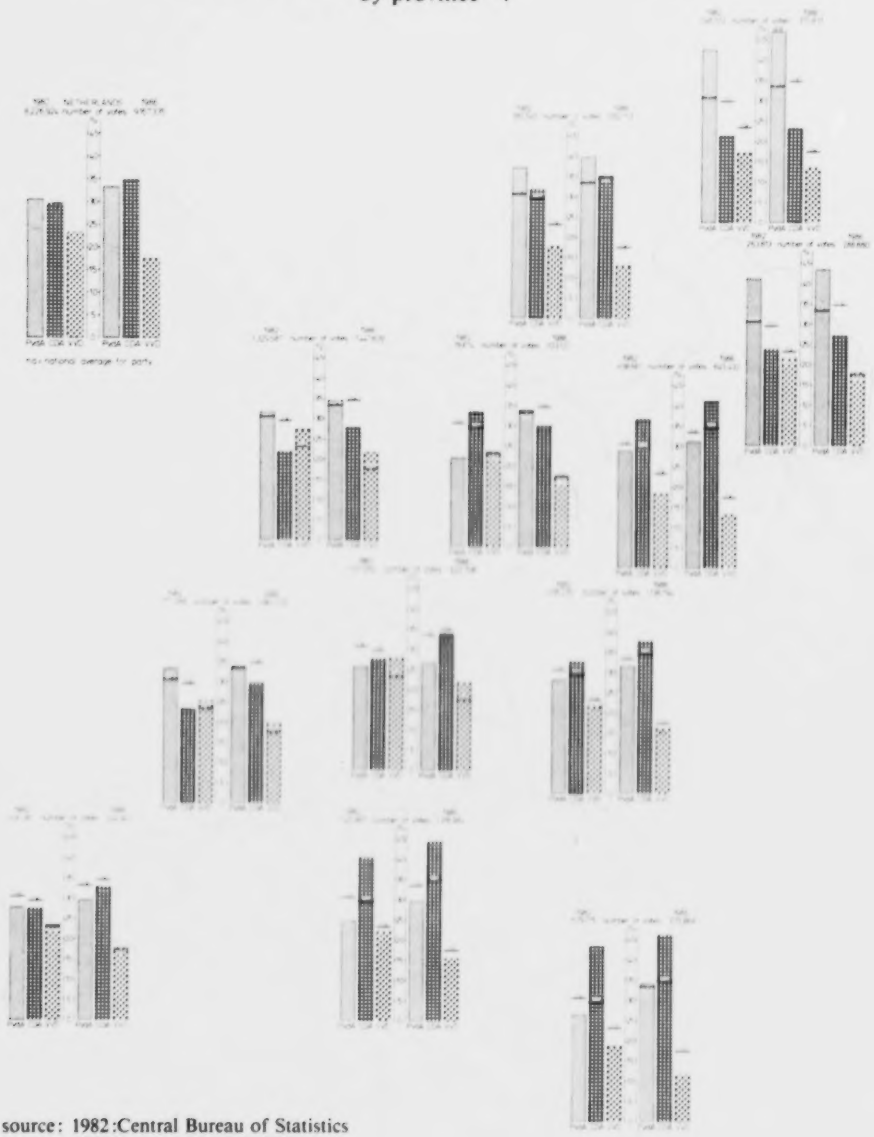
* Of the national total of 809 (parts of) polder boards, 93 have not been depicted since they are 'interprovincial', i.e. their territories extend over more than one province. However, their taxes are included in the national average. Taxes of polder boards require approval by the provincial government.

49. VOTING

Votes cast for the three* largest of the national parties in the elections for the (politically decisive) second chamber of the Dutch parliament on 8.IX.82 and 21.V.86, in % of all valid votes, by province.**



Basic source: 1982:Central Bureau of Statistics
1986:newspaper NRC-Hbl.

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* PvdA is the largest socialist party; CDA originated by fusion of one Roman-Catholic and the two largest Protestant parties; VVD is comparable to the liberal parties elsewhere. The three combined account for over 80% of all votes nationally.

** For the first time since 1840 the number of provinces has been increased, from 11 to 12, by the formation of Flevoland out of the IJssel Lake polders at 1.1.1986.

50. POPULATION DENSITY

Population density per km² of land at 1.1.1985, marked off in 4 groups of (economic-geographical) regions, each of which contains about a quarter of the Dutch population and can be qualified respectively as 'empty', 'livable', 'tight', 'crammed' by present-day Dutch perception of density (based on a national average of 426 persons per km²).

Basic source: Central Bureau of Statistics

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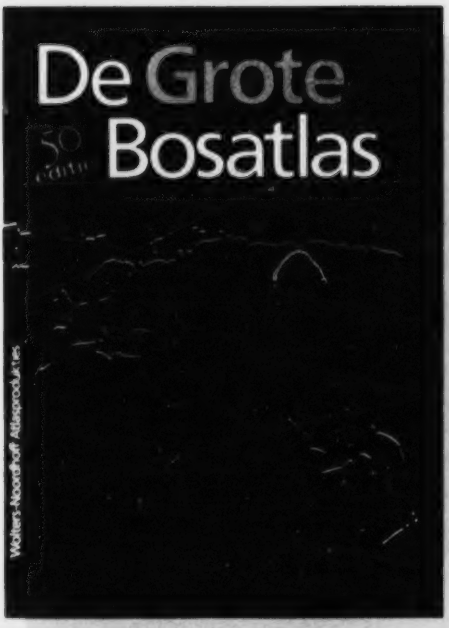

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